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AMERICAN CHEMICAL SOCIETY.

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THE AMERICAN CHEMICAL SOCIETY.

XXXIII.—Proceedings.

Regular Meeting, November 6, 1879.

The meeting was called to order at half-past eight o'clock, Prof. Leeds in the chair. In the absence of Dr. Goldschmidt, Mr. Casamajor acted as Recording Secretary.

The minutes of the last meeting were read and approved.

The following report of the last meeting of the Board of Directors was read:

Meeting of the Board of Directors of the American Chemical Society, held Monday, October 20, 1879, at the office of Messrs. G. H. Nichols & Co., 41 Cedar Street.

Present—Messrs. Squibb, Chandler, Endemann, Waller, Goldmark, Nichols and Casamajor.

Dr. Squibb in the chair.

In the absence of Dr. Goldschmidt, Mr. Casamajor was appointed Secretary. It was—

Resolved, That the Corresponding Secretary be requested to send a circular to the principal Public Libraries, asking subscriptions to the Journal of the Society, with a blank order attached. The price of the Journal is to be $5.00 a year, without discount.

A discussion took place on the scarcity of funds in the treasury of the Society, during the course of which, attention was called to the fact that the furniture of the rooms of the Society, which was to have been paid by private subscription, had been paid out of the general fund.

It was also shown that two hundred and eighty dollars, belonging to the Library Fund, had been spent in publishing the Journal and for other purposes.

To meet these deficiencies, it was—

Resolved, That the Chair appoint a committee of two members to solicit a subscription of $600, to pay for the furniture of the rooms, and another subscription of $280, to make good the Library Fund.

The Chair appointed Messrs. Casamajor and Nichols as such committee.

For the purpose of increasing the revenue of the Society, it was—

Resolved, That the Board of Directors recommend to the Society a change in the By-Laws, by which the annual dues of resident members be raised to ten dollars a year, to take effect after the first of next January.

A discussion took place on the advisability of removing the headquarters of the Society to some other locality. The present rooms were thought to be unnecessarily large and expensive, and Fourteenth street too noisy, on account of the great number of carriages which keep up a constant rumbling. This evil, at times, reaches such an extent, that it is difficult for all persons in the room to hear the speaker distinctly. On these accounts it was—

Resolved, That the Chairman appoint a committee of two, to look for other rooms, and report to the next meeting of the Board of Directors.

The Chair appointed Messrs. Goldmark and Casamajor.

The meeting then passed to the recommendation of the Directors, concerning a change in the By-Laws, whereby Section V. shall be altered to read as follows:

"Members residing in New York City, or within a radius of thirty miles about New York, shall pay an initiation fee of $5.00. The annual dues of such members shall be $10.00.

"Other members and the associates shall not be required to pay any initiation fee. The annual dues of such members and associates shall be $5.00.

"The annual payment of dues may be commuted by a single payment of $100.

"Members and associates in arrears for dues, for one year, may be dropped from the roll."

Notice having been given by Mr. W. H. Nichols, at the September meeting, of the intended change, the alteration was in order.

Mr. Nichols urged the necessity of providing for the expenses of the Society, and he thought that the resident members, who enjoy the advantages of using the rooms and the library, should contribute more liberally than non-residents.

Dr. Squibb called the attention of the meeting to the excellence of the JOURNAL of the Society, as at present conducted, which was well worth the price of $5.00 to every member; as, in addition to this, resident members had other privileges which were well worth of themselves $5.00, $10.00 a year seemed fair for the annual dues of resident members.

The recommendation of the Board of Directors was, on motion, unanimously adopted.

The next business in order was the report of the Nominating Committee.

According to the plan approved at the October meeting, the Nominating Committee (Messrs. Goldschmidt, Endemann and Goldmark) presented the following names for the approval of the Society. The offices of President and Vice-Presidents are left blank, to be filled in by every member with the candidates of his choice.

President.

.....

Vice-Presidents.

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Corresponding Secretary.

P. CASAMAJOR.

Recording Secretary.

ARTHUR H. ELLIOTT.

Treasurer.

W. H. NICHOLS.

Librarian.

E. WALLER.

Curators.

S. A. GOLDSCHMIDT, S. P. SHARPLES,
A. A. FESQUET.

Committee on Papers and Publications.

H. ENDEMANN, ARNO BEHR,
GIDEON E. MOORE.

Committee on Nominations.

HANBURY SMITH, J. GOLDMARK,
GEO. M. MILLER, A. BOURGOUGNON,
J. C. BATTERSHALL.

Board of Directors.

.....
.....
.....
} *Three Local Vice-Presidents.*

P. CASAMAJOR,
ARTHUR H. ELLIOTT,
W. H. NICHOLS,
E. WALLER,
H. ENDEMANN,
C. F. CHANDLER,
H. MORTON,
W. M. HABIRSHAW,
E. R. SQUIBB,
J. GOLDMARK.

As some of the Directors named in the above list will probably be elected as local Vice-Presidents, and be made Directors by this action, other names may have to be added, at the December meeting, to fill the vacancies created in this way.

The following persons were elected members: W. I. Outhout, Henry Doscher, and Henry C. Treist.

The following members were proposed by W. H. Chandler, and seconded by E. Waller and P. Casamajor: George Convers and Ed. H. Williams. Henry C. Meyer was proposed as associate, by Henry Morton, and seconded by H. Endemann and P. Casamajor.

The first paper was read by Lucius Pitkin, a student of the School of Mines: "On the Formation of Compound Platinates, and a New Platino-Potassium Salt." The next paper was by James H. Stebbins, Jr., "On Several New Coloring Matters."

A paper by H. Endemann, on "Boracic Acid as a Preservative," had been announced. Owing to the absence of Dr. Endemann this paper was not read. It was left to his option whether he should read this paper at the next meeting, or whether it should be read by title, and published in the JOURNAL. The next paper was by P. Casamajor, "On the Action of Bone Black on Solutions of Pure Sugar."

The following communication was received from Dr. Hanbury Smith:

I found the following item of news in a Swedish newspaper published in New York, called *Nordstjernan* (the north star), which I translate freely for the benefit of members not conversant with the Swedish tongue.

"A monument to Berzelius was uncovered on the 20th of August, at Wäfversunda, where the great scientist was born, on the same day of the month, 1779. The monument, twelve feet high, is of rough, hewn granite, with a finer cut inscription plate, on which, beneath a star, is cut in letters of gold: 'Here was born, in the year 1779, John Jacob Berzelius, the world-renowed scientist. The people of his native place raised this stone, 1879.' The monument is placed in a grove between the church and the house in which he was born. After music, Lagercrantz, Burgomaster of Wadstena, read a biographical sketch of the life of Berzelius, dedicating the monument to his memory. A chorus from Motala sang appropriate national songs, the band played, the festive bowls were produced, and toasts and speeches alternated with song and hurrahs. Engineer Werner Cronquist, in proposing a toast to the memory of Berzelius, dwelt upon the value of his labors to the industries of his country, especially as regards native, raw material. Dr. Noven proposed the health of the widow, Baroness Berzelius, also, the health of his relations, several of whom were present. Jacob Berzelius replied for himself and them. A supper finished the ceremonies."

The following papers by H. A. Mott, Jr., were announced for the next meeting: 1. "Absorption of Sugar by Bone Black." 2. "Practical Determination of the Sugar of Commerce."

The meeting adjourned.

P. CASAMAJOR,
Recording Secretary, pro tem.

XXXIV.—Some New Azo-Colors.

By JAMES H. STEBBINS, Jr., B. S.

When I first began the study of the azo-compounds, I selected as my starting point the action of diazobenzole upon the amines, amides, and phenolls, reserving the privilege of experimenting with the higher diazo-compounds at some future period.

The following compounds are the results of my experiments:

Azobenzole-trinitrooxybenzole.—$C_6H_5N{=}NC_6H(NO_2)_3OH$.

This compound was obtained by treating an alcoholic solution of picric acid with an aqueous solution of one molecule of diazobenzole nitrate.

After standing a short time the liquid became filled with long, brown needles. These had then to be filtered rapidly, as only a short contact with the mother liquor was sufficient to decompose them. They were then washed several times with cold alcohol, and dried in the air pump, over sulphuric acid.

When dry, they appear as long, brown, prismatic needles, with a strong metallic lustre. They are very explosive, a temperature of about 70° C. being sufficient to explode them. The melting point could not be obtained, owing to this circumstance.

They are insoluble in cold, but slightly soluble in boiling water, under partial decomposition. On the other hand, they are readily dissolved in warm alcohol, with a pretty yellow color.

The analysis of the above compound leads to the following result:

	THEORY.		FOUND.
C_{12}	144	43.21	43.33
H_7	7	2.10	2.59
N_5	70	21.02	20.93
O_7	112	33.67	———
	333	100.00	———

These figures prove the correctness of the assumed formula, viz.:

$$C_6H_5—N=N—C_6H(NO_2)_3OH.$$

Azobenzole-pyrogallol.—$C_6H_5—N=N—C_6H_2(OH)_3$.

This was obtained by treating an alkaline solution of pyrogallol, with an aqueous solution of 1 mol. of diazobenzole nitrate. Immediately a brick-red precipitate is formed, which increases on standing.

It was then collected on a filter, washed with a little alcohol, and dried.

It dissolves in glacial acetic acid and nitrobenzole, from which it crystallizes in dark, red-brown needles. An alcoholic solution of these dyes silk and wool of a pretty old-gold color, without mordants.

The analyses gave the following results:

	THEORY.		FOUND.	
	Anal. 1.		Anal. 2.	
C_{12}	144	62.60	62.36	62.28
H_{10}	10	4.34	5.23	4.64
N_2	28	20.86	——	——
O_3	48	12.20	——	——
	230	100.00		

These figures evidently lead to the following formula:

$$C_6H_5—N=N—C_6H_2(OH)_3.$$

Azobenzole-oxycarboxylbenzole.—$C_6H_5—N=N—C_6H_3\begin{cases}OH\\COOH.\end{cases}$

This pretty orange dye was obtained by the action of diazobenzole nitrate, on an alkaline solution of salicylic acid.

It crystallizes in orange-red needles, which are insoluble in water, but easily soluble in alcohol or ether.

If this compound be treated with strong sulphuric acid it dissolves, forming a sulpho-acid which, to me, has all the appearances of the compound obtained by P. Griess from diazosulphanilic and salicylic acids.

Azosulphoxylbenzole-phloroglucin.

This was produced by the action of diazosulphanilic acid on an alkaline solution of phloroglucin.

A heavy orange precipitate is thus formed, which is collected on a filter, dissolved in water, and precipitated as a soda salt, by means of common salt. The compound thus obtained has the appearance of an orange crystalline powder, and is easily soluble in water. The free acid may be obtained by treating a concentrated aqueous solution of

the soda salt with an excess of strong hydrochloric acid. It crystallizes in thin, orange tablets, with a beetle-green lustre.

Animal fibre is dyed a fine orange with these.

Azobenzole-diamidotoluole Nitrate.

This pretty orange dye stuff is obtained by treating an aqueous solution of diazobenzole nitrate with a solution of alpha toluylendiamine, m. pt., 99°.

Immediately the mixture assumes an orange-red color, and, after an hour's standing, the liquid becomes filled with fine, red needles. These are then thrown on a filter and allowed to drain ; they are then dissolved in boiling water, and the base is set free with ammonia, in the form of a yellow colored, crystalline precipitate. These crystals are then washed, and dried at 100°.

The analysis leads to the following formula :

$$C_6H_5—N=N—C_6H_2(NH_2)_2CH_3.$$

C_{13}	68.35	per cent.
H_{14}	7.61	"
N_4	24.60	"

The base unites readily with acids to form salts ; but the best form of salt is the chloride, as it is by far the most easily soluble and convenient to handle.

If a concentrated solution of the chloride be treated with an aqueous solution of zinc chloride, a heavy, crystalline, orange-red precipitate of the zinc double salt is formed.

Platinic chloride produces a precipitate of beautiful crimson needles, which constitute the platinum salt.

If this dye be dissolved in strong H_2SO_4, and heated for a short time, and then thrown in cold water, a heavy precipitate is formed, which constitutes the sulpho-acid.

This dissolves in water readily, but has a browner tinge than the previous dye.

Reducing agents decolorize the solution, regenerating toluylendiamine.

Diamidoazonaphthalene Hydrochlorate.

$$C_{10}H_7N=N—C_{10}H_5(NH_2)_2.2HCl.$$

I obtained this brown dye by the action of diazonaphthalene hydrochlorate in aqueous solution, on a solution of naphthalene diamine dissolved in alcohol. If a little of the solution be evaporated, the coloring matter will crystallize out in long, brown needles. These are insoluble in water, but quite readily soluble in alcohol.

Strong sulphuric acid dissolves it, with a fine blue color. Reducing agents decolorize the solution.

Azobenzole-sulphocresol.

$$C_6H_5—N=N—C_6H_2(HSO_3)OH.CH_3.$$

If an alkaline solution of cresolsulpho-acid be treated with an aqueous solution of diazobenzole nitrate, the result is a deep orange colored, oily liquid. If this be allowed to stand for a short time, and then be treated with an excess of hydrochloric acid, the acid, by this means set free, will, after a short time, crystallize in long, brown needles, with strong metallic lustre. These are quite soluble in alcohol—less so in hot water—to which they impart a fine orange color.

I am now working on the higher diazo-compounds, and have already obtained a series of new colors, far surpassing the previous ones in beauty and durability, and will, on some future occasion, lay before you the results of my work.

XXXV.—Action of Bone Black on Solutions of Pure Sugar.

By P. CASAMAJOR.

In a paper published in the *American Chemist*, for November, 1871, "On the Purification of Sugar Solutions for the Optical Saccharometer," I gave an account of experiments made with dry bone black on sugar solutions. These experiments led me to differ from the conclusion to which Dr. Schiebler had arrived, that bone black absorbs sugar from its solutions, and that, therefore, the use of bone black, even when thoroughly dried, tends to give results with the saccharometer that are lower than they would be without the use of bone black.

My attention was called to this subject again during the latter part of 1878, by several communications of our regretted fellow member, Professor J. M. Merrick, of Boston, to the *Chemical News*. In these communications Professor Merrick cites many authorities who agree in this: that the use of bone black, in tests by the optical saccharometer, tends to give results that are too low. In addition to citing these authorities, he gave experiments, made by himself, which confirm the opinions of the authorities cited by him. He found, in several cases, that when using bone black, the results were from 0.5 to 0.8 per cent. lower than they were previous to using bone black. Professor Merrick wrote to me at the time, calling my attention to these results, and I answered that, being very busy with other things just then, I had not time to go over the subject.

Since that time, during February of this year, I made some experiments to discover whether bone black really absorbed pure sugar from its solutions. In these experiments, I made use, in one case, of a solution of pure sugar, and, in another case, of a solution of good loaf sugar. The pure sugar was obtained by soaking good loaf sugar in alcohol for over twenty-four hours, washing the crystal with more alcohol, and, finally, drying the sugar over a water bath. The object of using pure sugar, or nearly pure, was to eliminate errors which might result from the unequal absorption by bone black of the impurities that exist in commercial sugars. These impurities are of many kinds, but it generally happens, with sugar of high grade, that the impurities are in such a condition that they exert no action on polarized light, so that, on making the correction after inversion, the corrected result is almost always the same as the direct test, when we operate with sugars of 90 per cent. or over.

There being a possibility that the effect of bone black, in lowering the saccharometric degree, was due principally to its power of removing dextro-gyrate impurities in greater quantity than the lævo-gyrate, the use of pure sugar would eliminate any error from this cause.

The experiments were conducted in such a way as to leave no doubt on the question whether bone black took up sugar from its solutions. A weight of bone black was used, which was many times greater than the weight of sugar that filtered over it.

First experiment.—This was made with 125 c.c. of recently and thoroughly dried new bone black. These 125 c.c. weighed 79 grms. The bone black was not washed to remove the salts.

The solution of pure sugar that was filtered over these 79 grms of bone black had a specific gravity of $1.052 = 12.75°$ Balling. In the optical saccharometer it stood at 51.5 per cent. These numbers give a coefficient of purity $= 100$. A volume equal to 80 c.c. was allowed to run out, the operation taking one hour. This portion that came through had a specific gravity of $1.057 = 13.05°$ Balling. In the optical saccharometer it stood at 49 per cent. These numbers give a coefficient of purity equal to 92.8 per cent.

This fall in the coefficient of purity from 100 to 92.8 cannot be due to absorption of sugar, although the fall in the saccharometric indication from 51.5 to 49 per cent., shows that sugar has been removed from the solution. The decrease in the coefficient of purity can only come from the impurities present in new bone black, and points to the necessity of washing new bone black before passing sugar solutions over it.

As the quantity of bone black was very large in proportion to the weight of sugar that filtered over it, the quantity of sugar removed from the solution may be taken as being very nearly the quantity which 79 grms of new bone black can absorb. To ascertain this quantity of sugar, let us take 80 c.c. of the solution, such as it went on the bone black, its specific gravity being 1.052, the weight of the solution was $80 \times 1.052 = 84.16$ grms.

The degree Balling being 12.75, and the coefficient of purity being 100, the whole weight of sugar in the 84.16 grms of solution was $0.8416 \times 12.75 = 10.73$ grms of pure sugar.

The 80 c.c. of solution which filtered through the 79 grms of bone black in the space of an hour, had a specific gravity of 1.057, which gives for the 80 c.c. of solution a weight of $80 \times 1.057 = 84.56$ grms. The degree Balling of these 84.56 grms being 13.05, and the coefficient of purity 92.8, the quantity of pure sugar in the filtered 80 c.c. is $= 0.8456 \times 13.05 \times 0.925 = 10.25$ grms.

Subtracting this from the quantity of sugar previously obtained, we have $10.73 - 10.25 = 0.48$ grms as the weight of sugar absorbed by 79 grms of new bone black, which is equivalent to 0.606 grm, as the quantity of sugar absorbed by 100 grms of new bone black.

Second experiment.—This experiment closely resembles the first. The bone black used was the ordinary bone black of the refinery. The quantity taken was 125 c.c., weighing 100 grms. The bone black was thoroughly dried, as in the first instance.

The solution of loaf sugar filtered over these 100 grms of old bone black had a specific gravity of $1.051 = 11.5°$ Balling. In the optical saccharometer it stood at 46 per cent. These numbers give a coefficient of purity equal to 99.5.

As in the previous case, a volume equal to 80 c.c. was allowed to run through the filter in the course of one hour.

The portion that came through had a specific gravity of $1.044 = 10.95°$ Balling. In the optical saccharometer it stood at 43.3 per cent., which gives a coefficient of purity equal to 98.6.

We may notice here at once that the fall in the coefficient of purity is insignificant when compared to what happened with new bone black. Still it points to impurities absorbed by the old bone black.

If we go over the same calculations as in the first experiment, we find that the weight of the 80 c.c. of solution was $80 \times 1.051 = 84.08$ grms. The total number of grms of sugar in 80 c.c. $= 11.5 \times 0.8408 \times 0.996 = 9.63$ grms.

The 80 c.c., after filtering over 100 grms of old bone black, weighed $80 \times 1.044 = 83.52$ grms, and the total weight of pure sugar in the filtered portion was : $10.95 \times 0.8352 \times 0.986 = 9.01$ grms.

If we subtract this quantity from 9.63, belonging to the 80 c.c., before going on the bone black, we have $9.63 - 9.01 = 0.62$ grm as the weight of sugar absorbed by 100 grms of old refinery black.

Conclusions.

These numbers : 0.606 grm for the quantity of pure sugar absorbed by 100 grms of new black, and 0.63 grm for the quantity of pure sugar absorbed by 100 grms of old black, are remarkably close, particularly if we consider the degree of approximation compatible with sugar analysis.

The quantity of sugar absorbed by 100 grms of bone black may be put down as 0.6 grm. It is possible that new bone black may generally absorb slightly more or less sugar than the old, but this point can only be settled by a great number of tests.

To return to the action of bone black in sugar tests, there seems little doubt that, in many cases, the addition of bone black seems to lower the saccharometric test. This action must, in part, be due to the comparatively greater absorption of the dextro-gyrate impurities that are found in commercial sugar.

As to the absorbing action of bone black on sugar, if, as the above experiments show, this absorption is about 0.006 of the weight of the black employed, there must be no perceptible error in shaking a small quantity of fine bone black with the solution previous to filtration. A quantity of black equal to 4.5 grms, shaken with 100 c.c. of sugar solution, will almost always produce a marked improvement in the color of the solution. If this quantity of bone black absorbs 0.006 of its weight of sugar, this absorption will be equal to $0.006 \times 4.5 = 0.027$ grm. Now this quantity divided by 26.048 grms (the quantity dissolved in 100 c.c. of solution) will give $\frac{27}{26048}$, which is very approximately $= 0.001$, or $\frac{1}{10}$ of 1 per cent., and this is the error which $4\frac{1}{2}$ grms of bone black may produce from its property of absorbing pure sugar. By absorbing dextro-gyrate impurities a greater error may arise, but I regret to say that I have not tried to solve this problem, which is well worthy the attention of chemists.*

* Dr. Scheibler has called attention to the error, committed in saccharometric tests, by using basic acetate of lead. As the precipitate obtained, occupies a certain volume, this volume must be deducted from the 100 c.c. measured by the graduated flask. By using a volume of liquid smaller than 100 c.c., the result obtained is necessarily too high. This being the case, a sufficient quantity of bone black, shaken up with the solution, may act as a corrective by lowering the saccharometric degree. If there was any constancy in the effect of acetate of lead in raising the saccharometric degree, and of bone black in lowering the test, it would be possible to neutralize a certain volume of basic acetate by a corresponding weight of bone black. Unfortunately, if I am not mistaken, experiments are wanting to elucidate this subject.

XXXVI.—On the Formation of Compound Platinates and a New Platino-Potassium Salt.

By LUCIUS PITKIN.

When a solution of platinum tetrachloride is mixed with a solution of potassium bromide, in some degree of concentration, a precipitate is formed, which, although resembling in many points the ordinary double chloride of platinum and potassium, is of a much darker color. The shade of color depends largely on the rapidity of the precipitation, rapid precipitation in the cold forming a dark orange powder, while a slower formation favors the production of small, reddish crystals. As will be seen further on, the amount of potassium bromide present, influences the color of the crystals, as does also the presence of hydrochloric acid in greater or less amount.

Two formulæ can be given for the reaction mentioned above. In the first we may suppose the chlorine of the platinic chloride combines directly with the potassium, forming a double chloride, while platinic bromide is left in solution; the latter then unites with a fresh portion of potassium bromide, and forms a double bromide of potassium and platinum.

I. $4KBr+3PtCl_4 = 2(2KCl,PtCl_4)+PtBr_4$.

$2KBr+PtBr_4 = 2KBr,PtBr_4$.

In this case a mechanical mixture would be formed of two equivalents of double chloride and one of double bromide.

In the second case, however, we may suppose a direct combination of the bromide with the chloride, forming a salt with the composition $2KBr,PtCl_4$.

II. $2KBr+PtCl_4 = 2KBr,PtCl_4$.

It is obvious that whether a mechanical mixture of double chloride and bromide takes places in the proportion of two to one, or whether a chlorobromo-platinate of potassium is formed, the percentage of each constituent remains exactly the same.

In order to determine, then, whether a new salt, of definite proportions, has been formed, or whether we are dealing with a mixture, we must resort to the use of solvents or fractional crystallization.

The percentage of platinum in both cases is 34.35, which was found to agree most closely with an analysis of the pulverulent precipitate, formed by adding platinic chloride to potassium bromide in excess.

In order to ascertain if hydrochloric acid would exercise a replacing power, and allow the formation of a double chloride, three determinations were made, of precipitates produced under varying circumstances.

In the first determination, 4 grms of potassium bromide were dissolved in a minimum amount of water, 2 c.c. of strong hydrochloric acid added, then .500 grm of $PtCl_4$ in solution. A pulverulent precipitate was the result—.4175 grm of which yielded .144 grm of metallic platinum, or 34.49 per cent.

The determination of platinum was made in the usual way, *i. e.*, a known amount of the thoroughly dried salt was decomposed by heat, with the aid of oxalic acid, and, after being thoroughly washed, was dried and weighed in the state of spongy metal.

The conditions of the second determination were the same, except that 1 c.c. of concentrated hydrochloric acid was used in place of the 2 c.c. of the previous experiment; .3565 grm of the precipitate gave .123 grm of metallic platinum, which is equivalent to 34.47 per cent.

In the third determination no hydrochloric acid was used, and the resulting precipitate contained 34.1 per cent. of platinum, .1444 grm being obtained from .4236 grm of the substance.

We see from this that hydrochloric acid has no effect on the chemical constitution of the precipitate, the average yield of platinum being 34.32 per cent., against a theoretical 34.35 per cent.

But the acid produced one effect which is interesting to note: without changing the constitution it produced a change in the color, which was not accidental or confined simply to these determinations, for a second trial fully confirmed the first. The change consists in the tint of the precipitate growing lighter in direct proportion to the amount of acid used.

It being thus proven that the precipitate was constant under variations in the amount of hydrochloric acid used, it remained to determine whether it were simply a mixture, or whether a new salt, not noted in any work on chemistry which I have consulted, had been formed.

The method chosen was fractional crystallization, as offering the best results for the separation, if a mixture, or for the confirmation of the definite character, if a new and constant salt.

The result has been such as to leave no doubt but that a salt of the composition $2KBr,PtCl_4$ is formed, under favorable conditions, while the investigation necessary to prove the fact has led to some interesting points in the relation of the chloro-platinates to the bromo-platinates of potassium.

In order to crystallize successive crops, a strong solution of potassium bromide was made, and platinic chloride, in solution, added, the bromide being in excess. By cautious evaporation, five crops of crystals were obtained, which it was supposed would, in the case of a mixture, yield a successive difference in the ratio of platinum, or else prove the existence of a chlorobromo-platinate, by exhibiting a constant percentage of platinum, and that percentage would be 34.35.

But neither result appeared, as the tabular view of the experiments will show. Crops 1, 3 and 5 were selected for determination :

EXPERIMENT 1.—CROP 1.

Amount ppt. used	.5371
Amount platinum	.1406
Percentage platinum	26.18

EXPERIMENT 2.—CROP 3.

Amount ppt. used	.3680
Amount platinum	.0960
Percentage platinum	26.10

EXPERIMENT 3.—CROP 5.

Amount ppt. used	.2688
Amount platinum	.0724
Percentage platinum	26.90

It will be seen that the crystallization has shown no change in the composition of the five specimens, but what it has shown is this, that boiling a haloid platinate of potassium with a strong solution of potassium bromide, insures the formation of a double bromide of platinum and potassium. The theoretical amount of Pt in $2KBr,Pt_4 = 26.3$ per cent., while the average of the above gives 26.39 per cent. of metallic platinum.

Here, also, a curious color change is apparent without change in chemical constitution, each successive crop becoming darker and darker.

The first crystals were bright red.

The second crystals were red.

The third crystals were brownish-red.

The fourth crystals were dark brownish-red.

The fifth crystals were blackish-red.

In order to put the question to a crucial test as to whether the boiling with potassium bromide produces double bromides, some double chloride was formed in the usual way, washed with alcohol, and then treated with boiling KBr solution. On recrystallization and

washing with alcohol, it proved to be a double bromide, yielding 26.00 platinum, while the double chloride yields 40.6 per cent.

A new set of crystals was then made by taking 2 grms of $PtCl_4$, .1404 grm of KBr, and making two solutions. Upon pouring these together a copious precipitate appeared; this was filtered, washed with alcohol and dissolved up, and from its solution successive crops of crystals formed.

It will be seen that in this case little time was given for the full action of the bromide on the chloride; and if the tendency is to form first a double chloride, which is afterwards acted on by the bromide, no chance was afforded by this process.

The resulting crystals, three crops of which were separated out, were all of the same tint—a rich, bright yellow—and gave:

First crop	38.3	per cent.	platinum.
Second crop	38.0	"	"
Third crop	39.0	"	"

The proportions used of the bromide and chloride were capable of forming the chlorobromo-platinate, if opportunity was given for full action, and the platinic chloride were perfectly pure. It was of Merck's manufacture, and none remained to test as to purity.

For the final and decisive test, as to the existence of platinate of potassium, in which bromine and chlorine are both united, I prepared my platinic chloride from spongy platinum, and afforded full opportunity for mutual reaction, by boiling several hours. The proceeding was as follows: 2.000 grms of platinic chloride were dissolved in 20 c.c. distilled water, and added to a solution of 1.404 grms of potassium bromide, in 50 c.c. water. The solution was then boiled for four hours, and finally evaporated slowly, and three crops of crystals recovered. These crystals were all of the same tint—a rich, dark orange—and gave uniform results in the determination of the amount of platinum contained.

Crop No. 1.

Amount used	1.0123
Platinum found	.3465
Percentage platinum	34.22

Crop No. 2.

Amount used	.6311
Platinum found	.2205
Percentage of platinum	34.70

CROP NO. 3.

Amount used	.6479
Platinum found	.2228
Percentage platinum	34.39

These percentages strike an average of 34.43 per cent., a variation of only .08 per cent. from the theoretical composition of chlorobromo-platinate of potassium, while their absolute identity in tint supplies another strong reason for considering them as such.

To resume, then, in closing, the following facts may be taken as well established :

1st. The formation of a compound containing bromine, when potassium bromide is used with platinic chloride.

2d. The conversion of chloro-platinates into double bromides, by action of hot solution of potassium bromide.

3d. The variation in shade of color in regular gradation, of crystals separated out of boiling bromide solution, as also the color effect of hydrochloric acid.

4th. The formation of a chlorobromo-platinate, by suitable action of platinic chloride on potassium bromide, which salt is of an orange color, and crystallizes in fine octohedra.

In the commercial analysis of potassium compounds the amount is generally estimated by the weight of the dried double chloride, or by the amount of metallic platinum contained in that salt. If the latter method is pursued, no objection can be urged, as one equivalent of platinum corresponds to two of potassium, whether in the form of double chloride, bromide, iodide of chlorobromo-platinate. But it is plain that no such relation exists between the amount of potassium and the salts mentioned.

If the weight of the precipitate is also known, it becomes an easy calculation to estimate the approximate amount of chloride and bromide present together, from the ratio between the dried precipitate and the platinum obtained from it.

Fresenius, in his quantitative analysis, recommends to treat salts of potassium, other than chlorides, with hydrochloric acid, and evaporate to dryness. Rose proposes the use of chlorine water in the same way. The latter method decomposes the bromide better than the former, but is rendered unnecessary if a determination of the metallic platinum is made.

It is my intention to investigate the corresponding salts of ammonium and sodium, and make a more extended examination of the properties of potassium chlorobromo-platinate, as I may have leisure so to do.

SCHOOL OF MINES, COLUMBIA COLLEGE, October 20, 1879.

XXXVII.—Boracic Acid as a Preservative.

By H. Endemann.

Boracic acid has, for the last ten years, held a place amongst our antiseptics, and has frequently been recommended for the preservation of meats and vegetable substances. The original discoverer, Gahn, sold in Europe two mixtures.

The one was a mixture of one part of boracic acid with one part of alum; the other, one part of boracic acid with two parts of alum. These were called respectively "aseptine" and "double aseptine."

Provisions, in part preserved by boracic acid, are generally within the time of from one to two months, covered with a black crust, provided they are kept in the ordinary oak provision barrels. Alum prevents this.

This observation, long ago published, I found verified in my own investigations. It was, at first, my intention not to preserve without salt, but to limit the quantity of the salt to be used by the addition of certain antiseptics. In the following, without going into the details of the numerous experiments, I shall give the results of those which are directly of interest to the question discussed in this paper.

It was found that fresh beef, packed with 1 per cent. of boracic acid and a salt pickle of 50 per cent., remained sweet and wholesome for several months, even if kept at an average temperature above 80° F. It was likewise found that previously salted beef could not be preserved by the addition of boracic acid. From this it was evident that the process of salting removed from the beef certain substances, in the absence of which preservation became impossible. These substances proved, on further investigation, to be the phosphates. It was, therefore, not the boracic acid which had been the cause of the preservation, but, rather, substances which are produced by the action of the boracic acid—the *acid* phosphates.

I could cite a long list of materials which cannot be preserved with boracic acid, owing to the want of phosphates. In all these cases, however, preservation would be possible if, with the boracic acid, a phosphate were to be added; a somewhat roundabout way, which can be improved, as I shall explain further on.

During my investigations regarding the disinfecting properties of various substances, I had found that it is very difficult to develop bacteria in a fluid containing acid phosphates, and also that many acids are powerful disinfectants, destroying the life of bacteria completely,

even if present only in small quantities. One part of HCl in sixty-four parts of Cohn's fluid, well stocked with bacteria, destroyed these completely.

I was led, therefore, to make experiments in which boracic acid was replaced by equivalent quantities of other inorganic acids, and thus ascertained that exactly the same results could be reached as with the use of boracic acid.

The best results were reached by the use of phosphoric acid, and mixtures of phosphoric acid and hydrochloric acid.

Phosphoric acid, even in dilute solution, acts powerfully on fresh meat, covering it with a white layer of coagulated albumen which, however, on standing, gradually disappears. Mixtures, however, where the PO_5 is partly replaced by HCl, do not act in a like manner; and, even if some precipitation should take place, will soon allow the meat to recover its original appearance.

Meats thus treated keep exceedingly well, and at least fully as well as when preserved, under similar circumstances, with an equivalent quantity of boracic acid.

Less favorable results were obtained by the use of sulphuric, nitric and acetic acids, which is easily explained by the instability of these acids.

The preservation by means of boracic acid cannot, therefore, be considered as involving a new principle; it is merely a variation of, but by no means an improvement on, the time-honored vinegar pickling. The insipid taste of free boracic acid and the acid phosphates prevents its easy detection, and brings consumers to the belief that the meat is fresh.

This peculiarity is the only one recommending the use of boracic acid.

A French commission, appointed to investigate the influence of boracic acid on the human system, found that it could be taken for a considerable time without producing any injurious effects. Yet, it is certainly neither a regular constituent of the body nor is it contained in our food, and it is, therefore, doubtful whether the results reached by the commission must be considered as conclusive, as, in the course of time, constitutional difficulties may supervene, if such preserved provisions are taken for a considerable period.

On the Volatilization of Platinum in Chlorine Gas.

By F. SEELHEIM.

Berichte der deutschen chemischen Gesel schaft, 12, 2066.

Some years ago I tried the following experiment: a piece of thin platinum foil was placed in a tube of difficultly fusible glass, and heated to bright redness by a gas flame which surrounded the tube. A slow current of chlorine was then conducted through the tube, and continued without interruption for twenty-four hours. At the end of this time it was found that the tube, behind the foil, was coated with crystals of platinum. The crystals showed the forms $\infty 0 \infty .0, \infty 0, \frac{\infty 0.n}{2}$, were beautifully developed, compact, lustrous, and the form could be recognized without the aid of the lense. Subsequently I tried the same experiment in a porcelain tube in a charcoal fire, but continued it for a few hours only. It furnished, again, crystals of the same form, only smaller. I sent a specimen of these crystals, in 1873, to Prof. R. Boettger, in Frankfort. Although the objection cannot be sustained that the platinum was mechanically transferred by the stream of chlorine, as it, in that case, would necessarily have assumed the form of an amorphous coating, I, nevertheless, recently tried the following experiment, to prove that platinum is volatile in an atmosphere of chlorine:

Some platinous chloride was placed in a small porcelain flask, with a very narrow neck. The flask was coated with loam, and, without closing the opening, heated to light redness in an ordinary portable furnace. After cooling and carefully breaking the flask, it was seen that the platinum had sublimed. A portion formed, in the lower part of the neck, a small sublimate of reticulated crystals, and below these the sides and bottom of the flask were coated with microscopic, but completely developed, platinum crystals which showed the lustrous faces above noted. It was evident that a white heat had not been entirely reached, as the platinum vapor would then have ascended to a higher point.

The experiments above communicated prove, with absolute certainty, that platinum is entirely volatile in chlorine gas. No platinous chloride was to be seen in either case. As, therefore, the hypothesis of a dissociation of chlorine in the experiments of V. and C. Meyer (Berl. Ber., **12**, 1426, and this JOURNAL, **1**, 313), rests, as they themselves remark, on the assumption that platinous chloride leaves, when heated, an *absolutely non-volatile residue*, the fact that, as above

shown, this assumption is incorrect, deprives the hypothesis of a dissociation of chlorine of the sole foundation on which it rested, and makes it unnecessary for us to have recourse to the two hypothetical explanations which Ad. Lieben (Comptes Rendus, **89**, 6, and this JOURNAL, **I**, 453) offered on the presumption that the porcelain and platinum had evolved no gaseous substance. The fact, observed by the Messrs. Meyer, that the volume of the chlorine in their experiments was one-third greater than at lower temperatures, may be explained in perfect harmony with the observed facts, by the equation:

$$Pt_2Cl_4 = 2Cl_2 + Pt_2 = 6 \text{ vols.},$$

wherein 2 volumes are occupied by platinum vapor. The experiment gains additional interest from the fact that it represents just as well a determination of the vapor density of platinum as that of chlorine. It only remains to determine by quantitative experiment whether the molecule of platinum consists of one or of two atoms.

It is another question how we are to conceive that the platinum volatilizes in chlorine gas. A chemical action must take place, as platinum is not volatile at the same temperature in indifferent gases. It has already been proven by the experiments of Troost and Hautefeuille (Comptes Rendus, **84**, 947), that when platinum is heated to 1400° C. in chlorine gas, it is deposited in crystals; and also, that when the gas is suddenly cooled, platinous chloride is deposited. They assume that the vapor at 1400° does not contain platinum, but platinous chloride, which, on cooling, dissociates and deposits platinum in crystals. If this view is correct, then, if the molecule of platinous chloride be Pt_2Cl_4, the vapor density of chlorine in the experiments of the Messrs. Meyer would be found to be greater than the normal figure; whereas, if the molecule be $PtCl_2$, it would be, at most, equal to it, and the probability of a dissociation in the experiments in question would thus be increased. We should, however, remain better in accord with the direct results of the experiments and with the phenomena of dissociation, if we should assume that the platinous chloride in the hot gaseous mixture is not stable, but in a condition of continual decomposition and recomposition. In this case there would always be present in the gaseous mixture platinous chloride, besides free platinum, the quantity of which would, at the temperatures employed by V. and C. Meyer, be so small, that it would have no perceptible effect on the volume. However that may be, there can be no thought of a dissociation of chlorine until it has been established that the gas experimented on is not contaminated with the vapors of other substances.

Answer to F. Seelheim's Remarks on My Experiments on Chlorine.

By VICTOR MEYER.

Berichte der deutschen chemischen Gesellschaft, 12, 2202.

Translated by H. Endemann.

Based upon the well-known experiments of Troost and Hautefeuille, on the behavior of platinum to chlorine at high temperatures, as well as on observations of his own, F. Seelheim undertook to critically examine the experiments published by C. Meyer and myself. He assumes that in our experiments, the platinous chloride which had been employed had volatilized, and that a mixture of two volumes of chlorine and one volume of platinum gas had been the contents of our apparatus. This objection is entirely without foundation. The chlorine was brought into the apparatus in the shape of platinous chloride, packed into small, deep, pail-shaped vessels. At the end of each experiment, the contents of this vessel were always found as a compact rod of spongy platinum, fitting exactly into it, and which frequently we were able to extract from it without injury to its shape.

If care was taken that the vessel with the sponge be removed from the apparatus without loss, it was found that the weight of the platinum was almost exactly the one required by theory as existing in platinous chloride. No sublimation of platinum or formation of crystals could be observed. It is, therefore, evident that a volatilization of weighable quantities of platinum could not have taken place.

But even without taking into consideration these points of fact, this might, *a priori*, have been assumed, for if the platinous chloride be heated, the chlorine will be evolved as soon as the temperature for its decomposition is reached, and will escape from the vessel containing the platinum; and, in the latter stages of the experiment, will be hardly in contact with it.

Seelheim has evidently taken no notice of a remark at the close of our paper, wherein it is stated that iodine, at high temperatures, undergoes exactly the same changes. Iodine, of course, was applied in its free state, and not in the shape of a platinum compound. The objections of Seelheim are, therefore, in this case, inapplicable.

But if now chlorine and iodine in both cases show analogous behavior, it is hardly to be doubted that the observed facts must, in both cases, be explained as depending on the same cause.

May I be allowed yet to say a few words regarding Troost and Hautefeuille's curious discovery, which has been confirmed by Seel-

heim, that yellow-hot platinum, by an intermediate formation of platinic chloride, may partly be volatilized, though platinous chloride is completely decomposed already at a temperature below 600° C.

I have frequently repeated Troost and Hautefeuille's experiment, and have investigated it likewise with regard to the quantitative proportions, and have found that in this, as in others, where the quantity of the one or other is to be considered, time forms an important element. Of a certain quantity of platinum which, at 1570° C., was acted upon by a lively current of dry chlorine gas, but one per cent. was volatilized. From this it is evident why, in our experiments, no perceptible quantities of platinum could be volatilized. For if the volatilized quantity of platinum is, within one hour, and in a rapid current of chlorine gas, but one per cent., it is evident that, in our case, within a few seconds, when the chlorine is moreover not in motion, the volatilized quantity of platinum can hardly amount to hundredths of this one per cent.—that is, a quantity which cannot be weighed, as not more than 0.07 grm platinum was present.

ZUERICH, November, 1879.

Abstracts from American and Foreign Journals.

American Chemical Journal.

Vol. I, No. 4.

Abstractor, J. P. BATTERSHALL, PH. D.

Researches on the Complex Inorganic Acids, WOLCOTT GIBBS, M. D.—The term "complex inorganic acids," is applied to those acids which are formed by the union of two or more acids, with elimination of water, the product possessing properties like an acid containing a single radical. The author refers to the previous investigations of Laurent, Scheibler, Marignac and others, on the alkaline salts of tungstic acid, and remarks that the accurate study of these compounds presents peculiar difficulties, owing, principally, to the fact that the salts are frequently very complex in character—those of one series also often approaching those of another in composition—and that they are efflorescent, and are decomposed by boiling water. The tungstic oxide in the compounds referred to was determined by the method of Berzelius, modified as follows:

Mercurous nitrate is added in slight excess to the boiling solution of the tungstate, and mercuric oxide added until the mercurous tungstate formed assumes a persistent reddish hue; the precipitate is then strongly ignited. The water was determined by simple ignition, and the alkaline base was generally estimated as difference.

Numerous complex salts are mentioned, and their method of preparation described. The classification of alkaline tungstates already noticed in this JOURNAL (*vide*, JOURN. AM. CHEM. SOC., **1**, 4, 111), is repeated, and the following arrangement of the alkaline molybdates is given:

NORMAL SERIES.

$MoO_3.Na_2O + 2Aq.$
$2MoO_3.2Na_2O + H_2O.$

META SERIES.

$4MoO.Na_2O + 6Aq.$
$6MoO.2Na_2O + 14Aq.$
$8MoO.Na_2O.2H_2O + 2Aq.$
$10MoO.Na_2O.3H_2O + 9Aq.$
$14MoO.6Na_2O + 44Aq.$
$16MoO.2Na_2O.5H_2O + 3Aq.$
$18MoO.2BaO.6H_2O + 2Aq.$

The remainder of this article is devoted to graphical formulæ of alkaline tungstates.

Contributions from the Sheffield Laboratory of Yale College. (No. 2.)

On some Compounds of Aromatic Amines with Silver Nitrate and Sulphate, W. G. MIXTER.

Aniline silver sulphate is prepared by dissolving silver sulphate and aniline in boiling water, filtering hot, and washing and drying the crystalline compound which separates out upon cooling. The analysis gave results corresponding to the formula: $(C_6H_5NH_2)_4.Ag_2SO_4.2H_2O$.

Paratoluidine silver sulphate is obtained in an analogous manner, and has the formula: $(C_7H_7NH_2)_4.Ag_2SO_4.2H_2O$.

Metanitraniline silver nitrate.—Prepared from an alcoholic solution of metanitraniline and silver nitrate; fuses at 124–125° C., and has the composition: $(C_6H_4NO_2NH_2)_4.AgNO_3$.

Nitrotoluidine silver nitrate is obtained from the aqueous solution of the nitro-amine and silver salt; it fuses at 131–132° C., and has the formula: $(C_7H_6NO_2NH_2)_4.AgNO_3$.

Paratoluidine silver nitrate melts at 101° C., and has the composition: $(C_7H_7NH_2)_2.AgNO_3$.

On Clarke's Method for the Separation of Tin from Arsenic and Antimony, FRED. P. DEWEY.

Influence of Acetic Acid on the Separation of Iron, as Basic Acetate, from Manganese, Zinc, Cobalt and Nickel, JOHN LEMETT.

These papers are noticed elsewhere.

On the action of Iodine Monochloride upon Aromatic Amines, A. MICHAEL and LEWIS M. NORTON.

Action of iodine chloride upon acetanilide.—Acetanilide was dissolved in a large excess of glacial acetic acid, and iodine chloride, in the form of vapor, passed into the solution. The iodacetanilide thus obtained has the composition, $C_6H_4INH(C_2H_3O)$, and forms white rhombic plates, which are slightly soluble in cold water, but readily soluble in alcohol, and fuse at 181½° C. Upon treatment with hydrochloric acid, this compound is converted into the chlorhydrate of para-iodaniline, which, on addition of ammonia, yields mono-iodaniline (fuses at 60° C). *Nitro-para-iodaniline* is prepared by heating para-iodacetanilide with nitric acid, and consists of yellow needles, insoluble in water, soluble in alcohol, having the composition, $C_6H_5IN_2O_2$, and melting at 122°. The action of iodine chloride upon acetanilide is limited to the formation of mono-iodo compounds—a distinction from the behavior of chlorine or bromine towards this body.

Action of two molecules of iodine chloride upon one molecule of aniline acetate.—Aniline, dissolved in an excess of glacial acetic acid, was treated with the calculated amount of iodine chloride. The di-iodaniline thus obtained forms long, white needles, which melt at 95°, and solidify at 64°. This compound has the formula, $C_6H_5I_2N$, and possesses weak basic properties.

Tri-iodaniline ($C_6H_4I_3N$) is formed by the action of three molecules of iodine chloride upon one molecule of aniline chlorohydrate. It also forms white needles, fusing at 185½°, and solidifying at 146°, and does not present basic properties. The authors consider this compound identical with that obtained by Stenhouse,* by the action of iodine monochloride upon aniline salts.

Di-iodometanitraniline ($C_6H_6I_2N_2O_2$) is prepared by the action of iodine chloride upon meta-nitraniline, no tri-iodo compound being formed. It consists of yellow needles, fusing at 145½°.

Mono-iodopara-nitraniline ($C_6H_5IN_2O_2$) is obtained by treating one molecule of nitraniline, dissolved in dilute chlorhydric acid, with two

* Journal Chemical Society, **2**, 2, 327.

mols. of iodine chloride. It forms long yellow needles, soluble in hot water, melting at 105½°, and exhibiting feeble basic properties. Together with this compound, there is formed in the above reaction a small amount of *di-iodopara-nitraniline*, which is insoluble in water; forms yellow prisms, having a fine blue color by reflected light, and fuses at 244°. This body was also prepared by treating a chloroform solution of 1 mol. of para-nitraniline with 2 mols. of iodine chloride.

Di-iodopara-toluidine ($C_7H_7I_2N$) is formed upon treating 1 mol. of para-toluidine (in HCl sol.) with 1 mol. of iodine chloride—the treatment of acetpara-toluide with iodine chloride having given negative results. It crystallizes in white needles, which fuse at 124½°.

Di-iodopara-amidobenzoic acid ($C_7H_5O_2NI_2$) is prepared by treating para-amidobenzoic acid with iodine chloride, and consists of white plates, fusing above 300°. Several salts of this acid were obtained, and analyses made.

The result of the action of iodine chloride upon meta-amidobenzoic acid, is a mixture of di- and tri-iodometa-amidobenzoic acids, which the authors were unable to separate. Iodine chloride fails to act upon acetmeta-amidobenzoic acid. The authors remark that, on the whole, the power of iodine chloride as a substituting agent is less than that of bromine or chlorine, and incline to the belief that in the above described compounds, the second and third iodine atoms, entering the molecules, have taken the ortho position toward the amido group.

The action of Phthalic Anhydride on Naphthalene in the presence of Chloride of Aluminium, EMILE ADOR and JAMES M. CRAFTS.—The principal product of this action consists of a black, tarry mass, which, upon treatment with a dilute solution of caustic soda, yields phthalic and *naphtoylorthobenzoic* acids ($C_{18}H_{12}O_3$). This latter acid crystallizes, from its alcoholic solution, in rosettes of microscopic prisms, and is insoluble in water. The Ba-salts are pretty soluble in water. Upon subjecting the portion of the tarry mass that is insoluble in caustic soda, to distillation, a distillate is obtained, which, when dissolved in benzine, gives, on addition of alcohol, a small quantity of crystalline flakes, melting at 181–186°, and having the empirical composition: C = 94.18; H = 5.89. The authors regard this new hydrocarbon as an isomere of chrysene, $C_{18}H_{12}$.

Note on Para-Nitro and Para-Amido Phenetol, E. J. HALLOCK.—Phenetol, when treated with fuming nitric acid, yields a dark-red, viscous liquid, which, on distillation, is separated into a

a solid and a liquid portion. The former, when purified, fuses at 58° C., and consists of mono-nitrophenetol, identical with that obtained by Fritzsche,* by the action of iodide of ethyl upon the silver salt of of para-nitrophenol. The author obtained the same compound by the action of potassium ethylic sulphate and potassic hydrate upon para-nitrophenol; also, by heating together iodide of ethyl, potassic hydrate and para-nitrophenol. Para-nitrophenetol, when reduced with hydrochloric acid and tin, yields para-monamido-phenetol, which forms an oily liquid, boiling at 253° C. This body somewhat resembles aniline, also combining with acetyl chloride to a crystalline solid.

Bulletin de la Société Chimique de Paris.

Abstractor, E. H. S. BAILEY, PH. B.

Vol. XXXII., No. 1, July 5, 1879.

On the Determination of Methyl Alcohol in Commercial Methylene, CH. BARDY and L. BORDET.

Noticed elsewhere.

On Di-amylbenzine, AMORY AUSTIN.—Di-amlybenzine is made by the distillation of amylbenzine, anhydrous aluminic chloride and chloride of amyl. The reaction is expressed by the equation:

$$C_6H_5(C_5H_{11}) + C_5H_{11}Cl = C_6H_4 = (C_5H_{11})_2 + HCl.$$

It is a colorless, slightly aromatic, inflammable liquid, insoluble in water, but readily soluble in benzine, alcohol and ether. It boils at 265–270°, and has a tendency to oxidize at high temperature.

Action of Bromine upon Di-chlorhydrine, E. GRIMAUX and P. ADAM.—This subject has been studied by Carius, Clauss and Wolf, and they have arrived at different conclusions. The author has investigated the matter, with a view of reconciling the different statements, and obtains results which agree with the last article of Carius. The product of this action, then, is dibrom-dichlor-acetone (CBr_2Cl—CO—CH_2Cl). This, exposed to moist air, readily takes up four molecules of water. The hydrate thus formed melts between 55–56°, and is permanent in the air.

On the Presence of Meta-nitrotoluene in Commercial Nitrotoluene, P. MONNET, F. REVERDIN and E. NOELTING.—Nitrotoluene was oxidized with potassic permanganate, the excess of nitrotoluene distilled off, and the liquid, after being filtered, evaporated to smaller

* Petersb. Acad. Bull., 17, 145.

bulk and precipitated by hydrochloric acid. The dried precipitate was treated with hot water, which left an insoluble residue of para-nitrobenzoic acid. This acid melts at 236°. From the mother liquor ortho-nitrobenzoic acid was also obtained.

Idem, No. 2.

Claim of Priority of "A New Method for the Determination of Sulphur, by C. Fahlberg and M. W. Iles," B. DELACHANAL and A. MERMET.

Idem, No. 3.

A New Method for the Determination of Sulphur in various Natural Sulphides, A. COLSON.

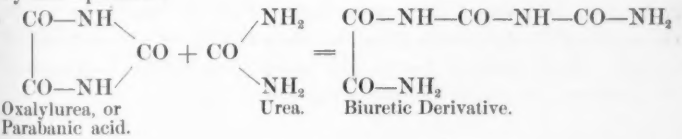
Noticed elsewhere.

On the Thermic Formation of Hydrogen Silicide, J. OGIER.—The gas was prepared by the decomposition of tribasic silici-formic ether by sodium. An apparatus similar to Berthelot's was employed. The gas was free from hydrogen, and was burned in oxygen. From the experiments, it is proved that by the union of Si and H_4, there is a disengagement of +24.8 calories of heat. This is nearly the number for the formation of marsh gas, viz. : +22 cal.

On the Thermic Formation of Silicic Ether, J. OGIER.—This was determined in two ways. By the analytical method the silicic ether was decomposed by a large excess of water, at the ordinary temperature, into silica and alcohol. This gave +21.6 calories as the heat disengaged. Taken with a contrary sign, it expresses the heat absorbed in the formation of pure silicic ether from alcohol and silicic acid. From this number, by subtracting the heat corresponding to the solution of four equivalents of alcohol in water, is obtained —11.44 calories, or the true heat of formation.

By the synthetical method, or the action of chloride of silicon on alcohol, the heat of formation was found to be —11.56, after requisite corrections had been made. The average calculated for a single equivalent of alcohol becomes —2.9 calories.

On a New Derivative of the Parabanic Series, E. GRIMAUX.—By heating together, at 125–130°, a mixture of urea and parabanic acid, a white soluble powder is obtained, which has the composition, $C_4H_6N_4O_4$. From its method of decomposition, it appears to be an amide of oxalyl-biuretic acid. Its method of formation is represented by the equation :



On Neutral Sugar and Inverted Sugar, P. HORSIN DÉON.—An effort is made to reconcile discordant results as given by various authors. From a variety of experiments, the following conclusions are reached. Neutral sugar and inverted sugar have the same composition, equal weights of glucose and of levulose. The true rotary power of glucose is its highest power, and that which has been determined as equal to + 53.23 corresponds to the highest hydrate. When sugar is inverted in absolute alcohol, glucose possesses its highest rotary power, which is supposed to be equal to that of levulose with a contrary sign, and from that time the inverted sugar formed is naturally neutral. Hence, neutral sugar seems to be a sugar inverted under such conditions that the glucose possesses its maximum rotary power; and it is probable that there is a sort of combination between the glucose and the levulose, since the water used as a solvent cannot make a hydrate of the glucose and destroy its neutrality. From a study of the action of simple boiling upon sugar, it is inferred that neutral sugar is the first state through which reduced sugar passes during the inversion of cane sugar. Therefore, the presence of neutral sugar; not coming in contact with sufficient water to act by its mass, the reduced sugar remains neutral. In this way can probably be explained the neutrality of Mitscherlich's sugar, as well as of the reduced sugar contained in raw sugar and molasses.

Palm Sugar from Calcutta, P. HORSIN DÉON.—The sugar made in Calcutta, from the juice of the date-palm, has the following composition:

Cane sugar	87.97
Reduced sugar	1.71
Gum	4.88
Water and volatile matter	1.88
Ash	0.50
Mannite, fatty matter, undet. and loss	3.06
	100.00

The reduced sugar contains: glucose, 1.53 per cent., and levulose, 0.18 per cent. An examination of the purified gum shows its rotary power to be $[a]D = 193.32$.

New Researches in Regard to the Bacillus Ferment of Urea, P. MIQUEL.—The *bacillus* may be easily obtained, free from *torula ammoniacale*, from sterile urine, by the addition of a few drops of sewage. At the end of forty-eight hours fermentation takes place. *Bacillus ureæ* is classified among the *anaerobies.*

On Sulphhydric Fermentation, P. MIQUEL.—There is a microscopic organism which has the power of causing sulphur to unite with hydrogen, producing hydrogen sulphide. This organism is found in sewage, in potable waters, and even in rain water. It attacks the insoluble albumen, slowly destroying it, and liberating most of its sulphur as hydrogen sulphide. It has the faculty of living and multiplying in a solution entirely deprived of air. This bacillus has also the power of attacking free sulphur, for if cultivated in a medium entirely free from sulphur or any of its compounds, it disengages carbonic anhydride and hydrogen; but if a little sulphur be introduced, hydrogen sulphide appears.

Idem, Nos. 4 and 5.

On the Use of Hydrogen Sulphide in the Dry Way in the Performance of Analyses, AD. CARNOT.

Noticed elsewhere.

On the Double Chemical Function, both as an Alcohol and as an Aldehyde, of various Monobasic Organic Acids, M. LOIR.—The author proposes to go farther than Gerhardt,* and not only to represent the anhydrides as ethers, but also to assume that the monobasic organic acids can, under determined conditions, comport themselves as alcohols, and their anhydrides, on account of their alcoholic function, would be ethers composed of the different alcohols. The organic monobasic acids and their anhydrides have reactions similar to aldehydes. The principle characteristic of an aldehyde is its property of changing to an alcohol under the influence of a reducing agent. A similar change takes place when an organic acid is treated in the same way. In the case of butyric acid, it not only forms a crystalline compound, when added to sodic bisulphite, but it decolorizes a solution of potassic permanganate. The same is true of valeric acid. Anhydrous acetic acid has the three characteristics of an aldehyde mentioned above, and also forms with ammonia a crystalline compound insoluble in ether. The mixed anhydrides, acetobenzoic and benzoacetic, have also the properties of aldehydes. From these and other facts stated, it is adduced that the various monobasic organic acids comport themselves like alcohol-aldehydes.

Action of Nitric Acid upon Diphenylguanidine Chloride, S. M. LOSANITCH.—Dichlor-diphenylguanidine, prepared according to Hofmann's process,† is dissolved in cold nitric acid. Red fumes are

* Annales de Physique et de Chimie, 3e series, **37**, 333.

† Deutsche chemische Gesellschaft, **2**, 455.

given off, and brilliant yellow crystals of dichlor-dinitro-diphenylurea separate out. This body has the formula:

$$CO\begin{matrix}\diagup NHC_6H_3ClNO_2\\ \diagdown NHC_6H_3ClNO_2\end{matrix},$$

and is insoluble in water, slightly soluble in alcohol, and fuses at 208–210°.

Idem, Nos. 6 and 7.

Iodimetry, based upon the use of Permanent Standard Solutions, E. ALLARY.—Modified method of J. Pellieux and E. Allary. Noticed elsewhere.

On the Oxidation of Formic Acid and Oxalic Acid by means of Ammoniacal Oxide of Copper, P. CAZENEUVE.—If oxalic or formic acid is heated in a sealed tube, at 150°, with ammoniacal oxide of copper, it is quickly changed to carbonic acid. The reaction is represented thus for formic acid:

$$CH_2O_2 + 2(CuH_2O_2) + 2(NH_3) = CO_3H_2(NH_3)_2 + Cu_2O + 2H_2O.$$
$$CO_3H_2(NH_3)_2 + Cu_2O + O = CO_3Cu(NH_3)_2 + CuH_2O_2.$$

Journal fuer Praktische Chemie.

New Series, Vol. XIX.

Abstractor, EDGAR EVERHART, PH. D.

Pyromeconic Acid, HERMANN OST (**19**, 177).—The free acid has a constant boiling point of about 225°, and leaves only a slight carbonaceous residue after distillation. Its vapor density could not be estimated on account of its slow evaporation and partial decomposition. It has only feeble acid properties, turning litmus only slightly wine-red.

There are two classes of salts formed, both being well characterized, and crystalline; the neutral, $C_5H_3O_3M$, and $C_5H_3O_3M + C_5H_4O_3$. The latter are called dipyromeconates. Both classes of salts are unstable, have alkaline reaction, are decomposed by water at 100°, and deflagrate when heated strongly. When the base is added in excess, the pyromeconic acid is quickly decomposed with the formation of much formic acid.

HCl and H_2SO_4 form compounds with the acid, having the respective formulæ, $C_5H_4O_3HCl$, and $2C_5H_4O_3.H_2SO_4$. Both compounds are decomposed by water. Nitric acid, added to a solution of $C_5H_4O_3$ in acetic acid, forms a nitro-pyromeconic acid, $C_5H_3(NO_2)O_3$, which is decomposed by boiling water. The nitro compound crystallizes in yellow prisms, and easily forms salts with bases. Sn and HCl reduce

it to the corresponding amide, $C_5H_3(NH_2)O_3$, which crystallizes in colorless needles, and acts as a powerful reducing agent.

Nitroso-dipyromeconic acid is obtained as a yellow precipitate, by conducting nitrous acid into an ethereal solution of the pyromeconic acid. An excess of the precipitant produces nitro-pyromeconic acid. The nitroso compound is very unstable, and, by water and alcohol, is changed, first, into pyromeconic acid and nitroso-pyromeconic acid, but, after longer standing, into a product having the composition, $C_5H_5NCl_4 + C_5H_4O_3$. This last crystallizes from cold water in monosymmetric tables, and, on boiling with chloroform, is split up into pyromeconic acid and an insoluble $C_5H_5NO_4$, which the author calls oxy-pyromecazonic acid. It crystallizes either anhydrous in colorless needles, or with water, in short, thick prisms which are soluble in hot water and alcohol, but insoluble in ether and chloroform. It is a monobasic acid. An excess of the base, however, easily decomposes it. It acts as a reducing agent, and is no nitroso compound. The soda, potash, baryta and lime salts have been prepared. With hydrochloric acid it forms a hydrochlorate, $C_5H_5NO_4HCl$. By long digestion with tin and hydrochloric acid, it is reduced to pyromecazonic, an isomere of amido-pyromeconic acid. This last body crystallizes in plates; is soluble, with difficulty, in water and alcohol, and insoluble in ether. It reduces silver solutions immediately, and forms an indigo blue color with ferric chloride. Can be partially sublimed. In alkalies it is easily soluble, but may then be readily oxidized by the oxygen of the air.

On the Constitution of the α-diamido-anthraquinone obtained by the Reduction of that Dinitro-anthraquinone, which is made by the Action of a Mixture of Nitric and Sulphuric Acids on Anthraquinone, H. VON PERGER (**19**, 209).—Since, by the melting with potash, alizarine is obtained, while the action of ammonia or alizarine produces another diamido-anthraquinone having quite different properties, it was converted into the monosulphonate by the action of fuming sulphuric acid at the ordinary temperature. The acid was crystallized out of alcohol. When the two amido groups were eliminated from the diamido-anthraquinone-sulphonic acid, an anthraquinone-sulphonic acid was obtained that was identical with that obtained directly from anthraquinone, and which, when heated with potash to 150–160°, yielded oxy-anthraquinone; by a higher temperature, however, alizarine.

An Analysis of the Mineral Spring at Rosheim, in Alsatia, F. B. POWER (**19**, 223).

On the Neutral and Acid Sulphates of Methyl and Ethyl Alcohol, P. CLAESSON (**19**, 231).—In order to avoid the formation of water which would take place were H_2SO_4 used, the author employs chlorosulphuric acid, $SO_2(OH)Cl$. Among some earlier investigators on the action of $SO_2(OH)Cl$ on the alcohols, Orlowski stated that, by the use of an excess of alcohol, the neutral sulphates were formed, which were insoluble in ether and could be purified by the same. These sulphates are decomposed by the smallest trace of water into methyl- or ethyl-sulphuric acid. The methyl sulphate of Dumas, and the ethyl sulphate of Wetherill, were regarded as the ethers of oxyethyl-sulphuric acid. Claesson found that the chlor-sulphuric acid and methyl alcohol yielded methyl-sulphuric acid and hydrochloric acid. The $HO.SO_2OCH_3$, when heated in vacuo to 130–140°, was almost quantitatively decomposed into the neutral ether and H_2SO_4. The neutral ether was found to be identical with that described by Dumas, and the product described by Orlowski was methyl-sulphuric acid. Claesson found, however, that the methyl-sulphuric acid is miscible with perfectly anhydrous ether, while in ordinary ether it forms two layers, owing to the fact that the acid combines with the water and becomes insoluble.

The action of $SO_2(OH)Cl$ on ethyl alcohol was attended with the same results. When equal molecules of the alcohol and acid were used, from 54.57 per cent. of the ethyl-sulphuric acid was obtained, while if three molecules of alcohol were used, the yield was 77.4 per cent. Herr Claesson also studied the action of ethyl-chlorsulphuric acid on alcohol. If the ether be allowed to drop into the alcohol a stormy disengagement of hydrochloric acid, ethyl chloride and ether takes place, and ethyl-sulphuric acid is formed; if, on the contrary, the alcohol be added to the ether, there is first a disengagement of ethyl chloride, then hydrochloric acid, a very little ether, and finally ethyl-sulphuric acid is left. The neutral sulphate is best prepared by conducting sulphuric acid anhydride into the ether and distilling in vacuo. It boils with but slight decomposition at 208°, is slowly decomposed by water—more quickly by alcohol—into ether and ethyl-sulphuric acid. The neutral ethyl sulphate is also formed during the preparation of the acid sulphate, and may be separated by means of chloroform.

On the Volume Constitution of the Sulphates, Selenates and Chromates of the Metals of the Magnesium Group, H. SCHROEDER (**19**, 266).

On the Behavior of Glue and the Carbohydrates with Chromates, under the Influence of Light, J. M. EDER (19, 294).—It was found that chromic acid, in the light, forms a coagulum with glue, which dissolves on warming. Further, that glue with a bichromate, in dry condition, could be kept in the dark for a long time without change, but if moistened and heated, it became insoluble. In the light, even when perfectly dry, the glue and bichromate are changed in a few seconds, the glue becoming insoluble in hot water, and the chromic acid becoming reduced to chromium trioxide. Formic acid is produced in considerable quantities by the oxidation of glue. Sugar, when mixed with a chromate, is much less sensitive to the light. The mixture loses its hygroscopic character, but not its solubility. Dextrine behaves like sugar. Albumen, with chromates, is very susceptible to the influence of light.

Contributions to the Chemistry of the Bile, G. HUEFNER, (19, 302).—The secretion of glycocholic acid, the separation of several important constituents of the bile, and on the preparation of cholic acid and cholamide.

On the Source of Hippuric Acid in the Urine of Herbivorous Animals, O. LOEW (19, 309).—Quinic acid was found in ordinary meadow hay. This acid would be changed into hippuric during the process of digestion. Benzoic acid was also recognized in cranberries.

On the Constitution of Dichlor-azophenol, R. SCHMITT (19, 312).—R. Hirsch had advanced the opinion that the body obtained from para-amidophenol, by chloride of lime, could not be dichlor-azophenol, but rather chlorquinonimide, because hydrochloric acid changes it directly into dichlor-amidophenol. In order to throw some light on the subject, para-azophenetol was digested a long time in sealed tubes, with hydrochloric acid, at a temperature of 150°. The result of the reaction was para-amidochlorphenol; hence, azo compounds can be changed directly into chlorinated amides by hydrochloric acid. Para-azophenol yielded, under like treatment, benzidine, aniline and para-chloraniline. Para-amidophenetol, however, did not yield with chloride of lime azophenetol, but the same product as para-amidophenol. The conclusion arrived at was that Hirsch was justified in his opinion, since in the formation of quinonimide the ethyl group must be eliminated from the amidophenetol.

A New Dye-Stuff from Ortho-amidophenol, G. FISCHER (19, 317).—The author has found that, by the oxidation of ortho-amidophenols (best oxidized by means of ferricyanide of potassium), a red

coloring matter is obtained that can be purified by sublimation. It forms garnet-red needles which sublime without melting at 241°. It is scarcely soluble in water, and, with difficulty, in alcohol, ether, &c., with a green fluorescence, possesses feeble basic properties, and dissolves in acids with a blue or deep violet color. The composition of the dye-stuff is $C_{24}H_{10}N_3O_2$.

On a Grey Modification of Tin, A. SCHERTEL (**19**, 322).—Schertel obtained a piece of tin that had been found in a walled-up window niche of the Cathedral at Freiberg, and that had lain there for several centuries. This modification of tin can be pulverized between the fingers; its specific gravity is 5.8; by heating merely in the vapor of aceton, it changes into ordinary tin; its color is leaden grey, and its fracture uneven. It is electro-negative to ordinary tin in a weak solution of caustic potash, hydrochloric and sulphuric acid, but electro-positive in nitric acid.

Notice on Malonic acid, HERR V. MILLER (**19**, 326).—The author finds that the best method of preparing this acid consists in treating potassium chloracetate in a concentrated solution with potassium cyanide (not in excess), and in decomposing the potassium cyanacetate, so obtained, by potassic hydrate. Potassium malonate crystallizes with two molecules of water in transparent monosymmetric crystals, which deliquesce in moist air. In the electrolysis of this salt, carbonic acid and hydrogen, with minute traces of ethylene, are given off.

On the Preparation of Crystalline Albumen Compounds, E. DRECHSEL (**19**, 331).—The preparation of these, according to Schmiedeberg, is attended with difficulty, but it can be easily effected by dissolving the crystalloids, freshly precipitated by carbonic acid, by digestion in water and magnesia, and bringing in a dialyzer placed in absolute alcohol. When the water diffuses in the alcohol, the granular crystals can be readily separated from the liquid. This method of "alcohol dialysis," the author recommends for the preparation of other albumen compounds in a crystalline condition. By this means urea in blood may be easily detected.

The Possibility of the Existence of Fungoid Growth in the Absence of Oxygen, M. MENCKI (**19**, 337).—This research is intended to refute the conclusions of Gunning (Berichte d. d. Chem. Gesell., **11**, 1380), who thinks that without access of oxygen decomposition cannot take place. From his experiments, the author concludes that the fungi die in sealed tubes, not by reason of the

absence of oxygen, but because of the gaseous products produced from themselves.

On Para-oxysalicylic acid, A. GOLDBERG (**19**, 359).—This acid was made by melting iodosalicylic acid with caustic potash. The iodosalicylic acid was not obtained directly from salicylic acid, but by treating para-diazosalicylic acid with a concentrated aqueous solution of hydroiodic acid. The oxysalicylic acid, 1:2:5 ($CO_2 = 1$) melts at 196°, and, on distillation with pumice, yields hydroquinone. It crystallizes in prisms, soluble in water, alcohol and ether; in its aqueous solution, ferric chloride colors it deep blue, and in its ammoniacal solution, argentic nitrate produces a precipitate, which soon turns brown and forms the silver mirror. An alkaline solution, in contact with air, is colored a reddish-brown. Its ammonium salt crystallizes in needles, as also does its barium salt. The ethyl-ester of oxysalicylic acid melts at 75°, is volatile with water vapor, and possesses a fruity smell. In decomposing the diazosalicylic acid directly with water, a good yield was obtained only when the acid suspended in water was saturated with concentrated sulphuric acid, and the sulphate decomposed by boiling with water.

On Ortho-diamidodiphenetol, R. MOEHLAU (**19**, 381).—A research on the base obtained by the decomposition of ortho-hydrazophenetol with acids. This base stands in the same relation to benzidine and toluidine as hydrazophenetol to hydrazobenzole and hydrazotoluol, and can, therefore, be called ortho-diamidodiphenetol (ortho-diethoxybenzidine), $C_6H_3(OC_2H_5)NH_2—C_6H_3(OC_2H_5)NH_2$.

The free base crystallizes from hot water in colorless needles or leaves, melts at 117°, distils under partial decomposition; is scarcely soluble in cold, more easily in hot water—easily in alcohol and ether, and is easily oxidized in the air. The hydrochlorate salt obtained by the action of hydrochloric acid on the hydrazophenetol, crystallizes in needles or plates that are easily acted upon by air, melts with decomposition above 120°, and is colored red by oxidizing substances. The stannous double chloride is adapted to the preparation of pure ortho-diamidodiphenetol. It crystallizes in rhombic plates. The hydrochlorate reduces the salts of the precious metals. A platinum double salt, however, can be prepared by adding a solution of platinic chloride in concentrated hydrochloric acid, to an alcoholic solution of the hydrochlorate. The salt is easily decomposed by water, and appears to contain three molecules of H_2O. The sulphate forms shining needles, soluble in warm water, and is decomposed at 100°. The nitrate forms colorless needles.

On the Action of Chloride of Lime on Ethyl Alcohol, R. SCHMITT and Dr. GOLDBERG (**19**, 393).—By the gradual warming of alcohol with chloride of lime, a yellow oil is formed, which explodes under the influence of light and heat. The explosive yellow oil could not be isolated or determined, but the author supposes it to be an ethyl-ether hypochlorite. The products of the decomposition of the oil have been investigated and recognized as aldehyde, monochloracetal, dichloracetal, and a yellow oil that boils at 77–78°, and supposed to be chlormethyl-ethyl-ether.

An Advantageous Method of Preparation of Phenolglycollic Acid, and on Pyrogalloltriglycollic Acid, PIERO GIACOSA (**19**, 396).—The method recommended is to melt on the water bath equivalent amounts of phenol and monochloracetic acid, and to add, with constant stirring, four parts by weight of caustic soda (spec. gr., 1.3). A violent reaction takes place, and, after cooling, the mass solidifies. The sodium salt freed from the mother liquor and treated with hydrochloric acid, yields the free acid, $C_6H_5O.CH_2CO_2H$, which may readily be purified by crystallization from warm water. With bromine water the acid yields a monobromine derivative. In like manner, from monochloracetic acid and pyrogallol, is made pyrogalloltriglycollic acid, which crystallizes in long, rhombic needles. It is soluble in hot water, melts at 198°, and yields crystallizable salts. The neutral potassium salt is changed by acetic acid into a difficultly soluble acid salt, $C_{12}H_{11}O_9K + H_2O$.

On Cyanamide, G. PRAETORIUS-SEIDLER (**19**, 399).—The author attempted to prepare oxyguanidine from hydrochloric hydroxylamine and cyanamide. He succeeded in obtaining a platinum salt having the composition, $2CH_5N_3OHClPtCl_4$, but neither the free base nor its hydrochloric acid salt could be isolated. By heating cyanamide with salicylic acid in an absolute alcohol solution, salicylic acid ether and urea were obtained, but the action of cyanamide on lactic acid yielded only urea and no lactic acid ether.

Results of the Norwegian North Sea Expedition, HERCULES TORNÖE (**19**, 401).—The author communicates his investigations on the gases held by the sea water at different depths. He confirms the results obtained by Jacobsen. Tables are given with the amounts of N and O, held in solution at different depths.

On the Antiseptic action of Acids, NADINA SIEBER (**19**, 433).—In a variety of experiments, the author has determined what percentage of acid was necessary to prevent putrefaction in solutions that

were favorable to the development of fermentation. He found that 0.5 per cent. of hydrochloric, sulphuric, phosphoric or acetic acid was fully sufficient for the purpose, while of butyric acid 1 per cent. was necessary, and of lactic acid somewhat more. Even 4 per cent. of boracic acid was not capable of entirely stopping fermentation. Finally, phenol was found to possess extraordinary antiseptic qualities in a 0.5 per cent. solution. In these acid solutions, however, there was always a mould.

On the Antiseptic Qualities of Pyrogallol, V. Bovet (**19**, 445).—It was found that pyrogallol, in a 1 to 1½ per cent. solution, was able to prevent the decomposition of animal tissue. A solution containing from 2 to 2½ per cent. pyrogallol removed the smell from a strongly smelling substance filled with bacteria, and destroyed the bacteria. Finally, 2 per cent. was enough to hinder alcoholic fermentation, as well as the vegetation of mould.

On the action of Chlorine on Dibenzyl, R. Kade (**19**, 461).—If chlorine be conducted over dibenzyl that has been previously melted with iodine, the dibenzyl melts, and if the operation be interrupted at the proper time, dichlor-dibenzyl is obtained. It crystallizes in shining plates that melt at 112°. It can be distilled unchanged, and by oxidation yields para-chlorbenzoic acid. If the dibenzyl, mixed with iodine, be powdered, and chlorine be conducted over it, at first toluylene, and afterwards dichlortoluylene, are produced. Toluylene is also made when chlorine is passed into dibenzyl vapor. Toluylene melts at 120°, dichlortoluylene at 170°. Finally, by the action of potassic chlorate on dibenzyl, toluylene ($C_{14}H_{12}$) is produced.

Methods of Estimating Chemical Affinity, W. Ostwald (**19**, 468).—Not suitable for abstraction.

Notice on Cyanethine ($C_9H_{15}N_3$), E. v. Meyer (**19**, 484).—Cyanethine, which, according to the experiments of the author, behaves with ethyl iodide and acetyl chloride as a trivalent base, when heated with moderately dilute sulphuric acid to 180–200°, gives off ammonia and takes up the elements of water, yielding a beautifully crystallizing base containing oxygen, and having the composition, $C_9H_{14}N_2O$.

On the Composition and Basicity of Hyposulphuric Acid, H. Kolbe (**19**, 485).—The author has tried all possible means to form acid salts of hyposulphuric acid, but in vain. He, therefore, regards it as a monobasic acid, having the composition, HSO_3, not $H_2S_2O_6$, as generally given.

Reports on Foreign and American Patents Relating to Chemistry.

Foreign Patents.

Condensed from R. BIEDERMANN's Report to the German Chemical Society, by H. ENDEMANN.

PETER STUART BROWN, Glasgow : *Method and apparatus for the manufacture of ammonium sulphate, from ammoniacal liquors, especially gas-water.* (Germ. P., No. 6198, July 30, 1879.)—The inventor proposes to use soda for the neutralization of the salt solutions which, on evaporation, become acid. Manufacturers of the sulphate have used ammonium carbonate for the same purpose.

ED. WESTON, Newark : *Galvanoplastic nickel plating.* (Germ. P., No. 6741, Aug. 4, 1879.)—Nickel precipitated from nickel ammonium sulphate or nickel ammonium chloride solutions, is hard and brittle, and cannot easily be polished. Boracic acid added to nickel solutions produces a fine precipitate of tough metal. The inventor uses for five parts of nickel chloride two parts of boracic acid

TH. FLEITMANN, Iserlohn : *Method to weld iron, cobalt and nickel together, for the purpose of plating.* (Germ. P., No. 7569, Dec. 15, 1878.)

N. G. H. E. STRUCK, St. Petersburgh : *Improvements relating to the manufacture of artificial stones, the preparation of cements and paints.* (Germ. P., No. 7581, Jan. 26, 1879.)

1. Artificial marble, with silicate of potash.—Crushed minerals, 280 parts by weight ; ground lime-stone or chalk, 140 parts ; ground and calcined calamine, 5 parts ; ground and calcined feldspar, 3 parts ; ground fluorspar, 2 parts ; phosphate of lime, 2 parts ; silicate of potash, 40 parts. If silicate of soda is to be used, take for forty parts : crushed minerals, 280 ; chalk, etc., 140 ; calamine, 6 ; phosphate of lime, 3 ; feldspar, 4 ; fluorspar, 1½.

2. Building stones, stone pipes, etc.—Crushed stone or sand, 4,000 parts by measure ; chalk or lime-stone, 528 do. ; calcined clay, 60 do. ; silicate of soda, 130–250 do.

3. Mill stones.—Coarsely broken quartz or flint, 4,000 parts by weight; chalk or ground lime-stone, 500 ; phosphate of lime, 45 ; feldspar, 60 ; fluorspar, 10 ; silicate of potash, 250.

4. For grinding stones and whet stones.—Fine quartz sand or emery, 127½ parts by weight ; lime-stone, 37½ ; calamine, 15 ; phosphate of lime, 15 ; feldspar, 2 ; fluorspar, ½ ; silicate of soda, 37½.

In using liquid glass in the composition described, no soluble chlorides are formed which would effloresce and require washing or soaking for their removal, but merely insoluble non-hygroscopic compounds.

KARL PHILIP KULMANN, Idar, and KARL AUGUST LORENZ, Oberstein : *Method to produce onyx from ordinary agates.* (Germ. P., No. 6740, Nov. 10, 1878.) —The agates are immersed for eight days into a nitrate of iron solution. Those parts which are to become white are then impregnated with a solution of 1 part of caustic potash, in 1 part of water. The dried material is then calcined at a red heat in a covered earthenware pot.

WILLIAM POCHIN, Salford : (Engl. P., No. 4270, Oct. 24, 1878.)—Proposes *to use the slag*, which is obtained by the process of *dephosphorizing iron with the aid of lime, as a manure*. To this end, at first, most of the lime and iron is removed by muriatic acid, and the residue is finally, by treatment with sulphuric acid, converted into superphosphate.

FRIED. GRAESSLER, Cannstadt : *Method for the manufacture of amidoazobenzole-sulphonic acids and homologues*. (Germ. P., No. 7094, Feb. 13, 1879.)—Instead of converting amidoazobenzole into the corresponding sulphonic acid, he proposes to start from sulphanilic acid ($C_6H_4NH_2.SO_3H$), which is, by the action of nitrous acid, first converted into diazobenzole-sulphonic acid, and this, by means of aniline, into diazoamidobenzole-sulphonic acid.

MEISTER, LUCIUS and BRUENING, Hoechst, a. M. : *Method for the manufacture of dye-stuffs*. (Germ. P., No. 7217, Dec. 3, 1878.)—By the action of the disulpho acids of naphthol on the diazo compounds of phenol, the naphthols and their ethers. Diazophenols produce yellowish-red dyes, while the diazophenol ethers produce red or bluish-red shades. Diazonaphthol ethers produce reddish-violet dyes.

E. A. G. BONG and L. THIERCELIN, Paris : *Apparatus for the mechanical preparation of safflor*. (Germ. P., No. 6345, Jan. 24, 1879.)—The separation of the yellow fibres which connect the three eyes of the flowers, is effected by means of several pairs of rollers, of which the first has the slowest motion, and those following rotate more and more rapidly. A blast finally completes the separation.

MATH. DUBISLAV, Schonungen : *Manufacture of a non-poisonous mordant*. (Germ. P., No. 7179, Jan. 15, 1879.)—1 kgrm fresh wine-yeast is evaporated with 4 grms tartrate of soda ; to the thick, boiling mass, 15 grms glue and 10 grms tannic acid are added. After drying and grinding, the substance is ready for the market. For its application, it is to be dissolved with a decoction of soap root and dye in water, if woolen goods are to be dyed, or without soap root if the bath is intended for the dyeing of silk.

VEREINIGTE GUMMIWAARENFABRIKEN, Harburg, Wien : *Artificial slate for writing slates, &c.* (Germ. P., No. 7194, March 18, 1879.)—Pumice stone and bone black, both powdered, are mixed with purified rubber and sulphur, in the following proportions : 10 india rubber, 16 pumice stone, 21 bone black, 5 sulphur. This mass, after it has been rolled in sheets, is piled in packages with intermediate layers of paper and tin sheets, pressed and exposed for 2½ hours to a temperature of from 130° to 140° C. Each single plate is finally packed between two plates of metal, which can be heated to 130° to 140°. After remaining here for two hours, the plates, after cooling, are removed and smoothed by pumice stone.

GEORGE GOUNDRY MUNGER, Rochester : *Lubricator consisting of petroleum, graphite, Japan wax, tallow and soda*. (Engl. P., No. 4329, Oct. 28, 1878.)

ALEXANDER BOURG and CHARLES BERTAU, Etricourt : *Improvement in air-pumps used in sugar houses*. (Germ. P., No. 7526, April 6, 1879.)

JACOB WILL. DECASTRO, New York : *Decolorizing sugar solution*. (Germ. P., No. 7129, Nov. 19, 1878.)—To the neutral sugar solution, $\frac{1}{10}$ per cent. of zinc nitrate is added ; then blood, or other albuminous substances ; after heating and stirring, coagulation takes place. The zinc is carried into the coagulum, carrying the coloring matters with it.

MORITZ WEINRICH, Pececk : *Method for the preparation of sugar saccharate from syrup and molasses*, with the aid of alcoholic solutions. (Germ. P., No. 7171, Oct. 1, 1878 ; Engl. P., No. 3252, Aug. 17, 1878.)—To the syrup or molasses a quantity of dry slacked lime, corresponding to 55 per cent. of the sugar present, is added. After some time, and the application of heat, the saccharate has formed. The mass is allowed to cool, and is then ground in the disintegrator, and stirred with alcohol for some time. The saccharate becomes sandy after repeated applications of fresh quantities of alcohol. A treatment of from ten to twelve hours completes the purification. The alcohol is recovered by distillation, and the residue from the distillation is used for manuring. Thus, 90 per cent. of the sugar present may be recovered.

RUDOLF BERGREEN, Roitzsch : *Method for the removal of the gases from the cells of sugar-beet roots.* (Germ. P., No. 984, Oct. 11, 1879.)—Waste steam of 75° to 80° C., in a partial vacuum, is used for this purpose.

W. KETTE, Jassen : *Method for the recovery of albuminoids from diluted potato juice.* (Germ. P., No. 7428, March 19, 1879.)—With the aid of liquid glass and acids.

O. THUEMMEL, Berlin : (Germ. P., No. 7593, April 18, 1879.)—*Feed* prepared by mixing 100 pts. *husks* (distillery remnants) with 8½ *beet-sugar molasses*, at a temp. of 50° C.; then 33½ pts. of rye or wheat bran are added ; cakes are formed from this, and baked and roasted.

G. H. E. BERING, Bromberg : *Removing the bitter principle of lupines.* (Germ. P., No. 7706, Feb. 5, 1879.)—By means of soda, in order to make them fit for food.

E. JOHNSON SPITTA, Clapham : *Food for children.* (Engl. P., No. 4402, Oct. 31, 1878.)—Consisting of wheat-flour, ginger, sugar, milk and water.

P. SCHWING, Barmen : *Substitute for coffee.* (Germ. P., No. 7513, Sept. 26, 1878.)—Arabian or Turkish wheat is malted, dried, roasted and ground.

AUGUSTE BORCHERS, Valparaiso : Proposes *the use of a plant, Eugenia Cheken, as a medicine.* (Engl. P., No. 3529, Sept. 6, 1878.)—Inhalation of vapors from an infusion of this plant is prescribed in attacks of diphtheria, laryngitis, etc., and the decoction for diseases of the intestinal canal. It is also stated that it acts upon the kidneys.

JEAN WICKERSHEIMER, Berlin : *Preservation of corpses.* (Germ. P., No. 7265, April 23, 1879.)—Dissolve in 3 liters of boiling water, 100 grms alum, 25 grms salt, 12 grms saltpetre, 60 grms potash and 10 grms arsenious acid. After cooling, filter. To 10 liters of the neutral fluid, 4 liters of glycerine and 1 liter of methylic alcohol are added. For the preservation of the corpse of a child, 1½ liter ; for a grown person, 5 liters are required. Smaller objects are simply immersed from 6 to 12 days. (It is stated that the German government has bought this patent, and for the purpose of aiding its universal application, has allowed its free use.)

JAMES MACTEAR, Glasgow : *Apparatus for the manufacture of sulphurous acid.* (Engl. P., No. 3901, Sept. 19, 1878.)

WILL. WALLACE, London : *Manufacture of ammonium sulphate.* (Engl. P., No. 3694, Sept. 19, 1878.)

LUDWIG MOND, Northwich : *Treatment of salt solutions.* (Engl. P., No. 3999, Sept. 11, 1878.)—For the manufacture of soda and ordinary salt.

HOLBROOK GASKELL, Widnes : (Engl. P., No. 8783, Sept. 25, 1878.)—*Improvement in the manufacture of alkali*, concerning the prevention of the formation of cyanides by the action of air and steam on the mass, which is heated on a revolving hearth.

GEORGE GLOVER, Carville Chemical Works, Wallsend, Northumberland : (Engl. P., No. 3973, Sept., 1878.)—*Method to destroy cyanides, sulphides and hyposulphites*, in the manufacture of soda. The inventor adds manganese oxides, natural or artificial, which form manganates, which in turn oxidize the substances to be destroyed. 100 grms manganese ore of 60 to 70 per cent. are generally sufficient for each ton of soda. Soda thus prepared is said to be as pure as refined alkali.

R. LAVENDER and JOS. RICHARDS, Pontypool : (Engl. P., No. 3182, Aug. 12, 1878.)—*Utilization of the sulphuric acid* which has been employed for the cleaning of the iron previous to tinning. The fluid is distilled until the residue, by destructive distillation, ceases to give off any gases ; the latter are conducted into a sulphuric acid chamber.

FAURE & KESSLER, Paris : *Apparatus for the concentration of oil of vitriol.* (Germ. P., No. 6972, Jan. 25, 1879.)—Not new.

SCHNEEBERGER ULTRAMARINE WORKS, SCHINDLER, Bockau : *Apparatus for the absorption of diluted acid gases.*—To this end they are, with the aid of a ventilator, pressed into large chambers, where they come into contact with a current of water, passing in an opposite direction over pieces of lime stone.

C. HILT, Kohlscheid : (Germ. P., No. 7590, Jan. 1, 1879.)—*Method of preparing from coal dust bituminous coal bricks*, with the aid of paper pulp prepared from wood.

WILLIAM WHITE, London: *Filters.* (Engl. P., No. 3746, Sept. 21, 1878.)—5 parts of red oxide of iron, 2 parts powdered charcoal and 2 parts of clay, are moulded, dried and baked.

ARCH. HENRY PLANTAGENET STUART WORTLEY, London : *Preparation of electrodes for the electric light.* (Engl. P., No. 3656, Sept. 17, 1878.)—To prevent the waste of the carbon points, the carbon is mixed with a magnesium silicate, for instance, asbestos, which, shortly after they commence to be used, melts, thus effectually excluding the oxygen, and preventing waste by combustion. The composition is given as follows : 100 pts. gas coal, 2 pts. graphite, and 1 pt. of asbestos, resp. 1½ pts. steatite. Instead of this an asbestos cap for ordinary carbon points is proposed.

WILH. GRUENE, Berlin : *Method to obtain raised and dead etched writing or pictures on glass or porcelain.* (Germ. P., No. 6676, Nov. 19, 1878.)—For this purpose the glass is etched with fluid hydrofluoric acid. The picture, however, is not prepared with a mass which is perfectly proof against hydrofluoric acid ; thus the glass around the picture or writing is eaten away, keeping at the same time its polish, while the picture appears raised and dead. As such substances, lac and oil varnishes are mentioned. Solutions of asphaltum, gutta percha or India rubber are not applicable.

JOS. HECKMANN, Loughton : (Engl. P., No. 3130, Aug. 8, 1878.)—*Treatment of paper and parchment*, to make erasures unfailingly visible. To the mass used for sizeing, Prussian blue and ammonium sulphide are added.

JOÃO ANAST. ROSA, Paris : (Engl. P., No. 3883, Oct. 3, 1878.)—*Waterproof leather*, by means of the application of colophonium or other rosins in turpentine, petroleum ether, etc.

JAMES HART, Stratford : (Engl. P., No. 3798, Sept. 26.)—*Cement* consisting of glue, white lead, oil, alum and borax.

ADOLPH SCHLIEPER, Veysaux, Switzerland : *Food.* (Engl. P., No. 3102, Aug. 6, 1878.)—123 kgrms wheat flour, 13 kgrms bean flour, 6 kgrms oatmeal, 1 kgrm salt, 0.160 kgrm soda, 0.240 kgrm calcium phosphate, are mixed with water, formed and baked. The cakes are then ground, and the flour thus obtained mixed with 12 kgrms corn meal. This mixture is said to contain the various substances in such proportions, as to be most serviceable for the daily wants of the human body.

JOSEPH WILSON, Penrith : *Recipe for the destruction of parasites on animals and plants.* (Engl. P., No. 5090, Dec. 12, 1878.)—The inventor melts 50 pts. of tallow and 25 pts. rosin ; he then adds 50 pts. alkali and 25 pts. borax—finally water, and boils. To this, 75 pts. of carbolic acid and 30 pts. of calcium sulphuret solution, and 80 pts. of a tobacco decoct, are added. According to the views of the inventor, sulphoglycerolcarbolate of nicotine is formed.

JAMES BALLANTYNE HANNY, Glasgow : *Paint for the protection of objects under water.* (Engl. P., No. 5088, Dec. 12, 1878.)—60 pts. alcohol, 9 shellac, 4 rosin, 3 gallipot, 2 soft gallipot, 4 arsenite of copper, 3 arsenite of mercury, 9 chromate of mercury, and 6 coloring matter.

GUST. BERNHEIM, Brussels, and JAMES CROSTON, Manchester : (Engl. P., No. 4925, Dec. 3, 1878.)—*Fire extinguisher*, consisting of a solution, to be used in place of water. It consists of 700 pts. calcium chloride, 20 conc. sol. of baryta, 20 conc. sol. of potassium bicarbonate, 10 conc. sol. of sodium tungstate, 50 ammonium chloride, 25 magnesium sulphate, and 175 water.

ROBERT MUELLER, JR., and H. BOECKEL, Schoenebeck : *Method for the manufacture of iodine and bromine.* (Germ. P., No. 7743, Sept. 12, 1878.)—The apparatus consists of a tower which is filled with coke or stone. From above, the brine containing iodine and bromine enters, from below, chlorine and steam. Near the pipe where the brine enters are the openings through which the iodine and bromine pass into the condensers. To make the action a continuous one, two generators for chlorine are provided.

DICK H. YEOMANS, Middlewich : *Concentration of brine.* (Engl. P., No. 168, Dec. 17, 1878.)

FRED. VERSMANN and JUL. VON QUAGLIO, London : (Engl. P., No. 5291, Dec. 27, 1878.)—Claim *the use of metals incorporated into porous substances*, for the purpose of removing sulphur compounds from illuminating gas. Tungstic and titaniferous iron ores, ground, are given the preference. The temperature at which such actions will take place most advantageously is given as 280° to 300°.

MICHAEL NEUMANN, Raab : *Artificial wool from flax, jute or hemp waste.* (Engl. P., No. 5178, Dec. 17, 1878.)

JAMES HICKISSON, London : (Engl. P., No. 5122, Dec. 13, 1878.)—In order to enable one to write or print on paper, linen or other textile fabrics, the inventor proposes *the use of vanadium inks, fluid or dry.* The vanadium salt, and the salts used for their oxidation, generally nickel and cobalt, are kept separate. Two

pieces of cloth are saturated with the one and the other, and the cloth to be printed is put between. By pressing upon this with a pencil or stamp, the cloth becomes impregnated with both solutions, and thus the print is developed.

A. J. POIRRIER and D. A. ROSENSTIEHL, Paris: (Engl. P., No. 5157, Dec. 16, 1878.)—In order to give to textile fabrics a metallic gloss, the inventors *saturate them with a metallic salt solution* (lead acetate), and bring them before they have become perfectly dry, into boxes, at the bottom of which a sulphide is brought, which, in contact with the air, will slowly develop hydrogen sulphide.

JAMES LAW, Castleton near Manchester: *Mordant for Turkish-red dyeing.* (Engl. P., No. 3696, Sept. 18, 1878.)—The whole is an inferior reproduction of the Mueller-Jacobs process. (Germ. P., No. 1448, Sept. 30, 1877.)

ALFRED EM. MÉRY, Paris: *Manufacture of pigments.* (Engl. P., No. 3741, Sept. 21, 1878.)—The colors are to be mixed with a paste consisting of 24 pts. isinglass, 534 glycerine, 208 water, 208 beeswax, 12½ ammonia, 12½ rosin.

THOS. A. DOWLING and JOHN HARDMAN, New York: *Preservation of wood.* (Engl. P., No. 5211, Dec. 19, 1878.)—The wood is heated under heavy pressure in an air-tight cylinder, the sap escapes, and the wood is allowed to cool, while the pressure is kept on. This mode of treatment is said to prevent the wood from splitting.

WALTER JEYES, Birmingham: *Antiseptic.* (Engl. P., No. 5249, Dec. 23, 1878.)—100 pts. dead oil, 60 pts. caustic soda, 30° B.; 89 pts. rosin, 20 pts. vegetable oil. To obtain a solid mass, anthracene or naphthalene are added to this.

K. and TH. MOELLER, Brackwede: *Purification of water for use in steam boilers.* (Germ. P., No. 7343, Jan. 4, 1878.)—The inventors use different methods according to the composition of the water.

1. When a water contains bicarbonate of lime and gypsum. They add so much milk of lime as to convert all the carbonic acid into neutral carbonate, which is precipitated. Thereby another advantage is gained, inasmuch as the gypsum, which is carried down into the incrustation by the monocarbonate, remains now in solution, as far as its solubility permits. Before this point is reached, however, the whole water is discharged, and the operation is then again commenced with a fresh quantity. The crystallization or separation of the gypsum from the water may be prevented to a certain extent, by the addition of some salt The average time for which a boiler, filled with water purified by this plan, may be used, is from two to three weeks.

2. The water contains mono or bicarbonate of magnesia. Remove these by the addition of lime in excess, and the latter by soda.

3. The water contains carbonate of magnesia and bicarbonate of lime. Treat according to 1.

4. The water contains bicarbonate of lime, sulphate of lime, and carbonate of magnesia. Treat according to 1 and 2.

5. Magnesium chloride is removed by an excess of lime, and this by soda.

6. Sulphate of magnesia. Treat first with excess of lime, and remove this and the gypsum formed by soda.

7. Magnesium chloride and sulphate are, also, first decomposed by lime in excess, and the resulting water is then treated with soda.

8. Waters which contain magnesium chloride, sulphate and carbonate, and calcium carbonate, or other combinations of these bases and acids, are purified in a similar manner.

9. From waters containing lime and magnesia, these have to be removed by soda and heat, as otherwise they prove very destructive to iron.

J. C. GLASER, Berlin: *Methods to remove the bitter taste from lupine seeds, and to preserve them.* (Germ. P., No. 6175, Nov. 10th, 1878.)

JULIUS W. KLINGHAMMER, Braunschweig: *Thalpotasimeter.* (Germ. P., No. 8101, Feb. 5, 1879.)—A new thermometer consisting of an S-shaped tube, closed at one end and filled with a substance which must be a gas at the temperature to be measured. At the open end of the S-shaped tube, a gauge measures the inside pressure, and from this the temperature is calculated.

G. KUEHNEMANN, Dresden: *Improvement regarding the automatic introduction of substances into the analyzator, and the treatment of tough pastes in the same.* (Germ. P., No. 7849, April 11th, 1879.)—This apparatus is intended for the separation of soluble from insoluble substances, as well as for that of the volatile from the non-volatile. There is but little doubt but that this apparatus will be a welcome help in many technical branches, and the improvements intend to extend its usefulness. A useful description cannot well be given without a cut.

American Patents.

Condensed from the Official Gazette of the **U. S. Patent Office**, by ARNO BEHR.

November 4, 1879.

221,187.—*Processes for removing extractive matters from tanned leather.* GEORGE PLUMER and CHARLES P. KERANS.

Brief: Treats the tanned leather with a solution of borax and water previous to the re-tanning of the said leather, in order to remove all extractive matter, and softens and cleanses the leather.

221,200.—*Galvanizing metal.* WM. H. WAHL and EDWARD Y. ELTONHEAD.

Before being subjected to the process of galvanizing, the iron objects are treated in an acidulated bath of chloride of zinc.

221,219.—*Processes for tanning.* MILO L. DOTY.

The object is to dispense with the use of machinery for steeping and handling the hides, and, instead, to apply directly to the hides suspended in open air, a moist, pasty compound, containing tannin. This compound consists of ground grain, a solution of tannin and salt, and is repeatedly moistened until the hide is thoroughly tanned.

221,281. *Manufacture of chrome steel.* RICHARD BROWN.

Chromates or bichromates of the fixed alkalies, or the alkaline earths, are mixed with the molten metal.

221,297.—*Manufacture of tartaric acid.* HERMANN GOLDENBERG.

An abstract of the German patent has been given in this JOURNAL, I, 299.

221,308.—*Compounds for filling the pores of wood.* THOMAS G. HOJER.

A mixture of "barytes, whiting, calcined plaster, raw linseed oil, and liquid manganese drier."

221,357.—*Processes for curing meats.* I. MOWAT REID.

Meat is subjected to the action of heated, compressed air, in an air-tight apparatus.

221,381.—*Preparation of dye-stuffs.* MORRIS WISE.

Relates to the preparation of a dye-stuff from pimento leaves.

November 11, 1879.

221,400. *Alloys for journal-bearings.* BENJAMIN I. DOWNS.

An anti-friction metal composed of 32½ pts. tin, 5 pts. copper, 2 pts. antimony.

221,421. *Kerosene oil testers.* THOMAS DE WITT PICKNEY.

The bulb of a thermometer is made in the shape of a cup which contains the oil, the flashing-point of which is to be ascertained.

221,541. *Processes for preventing mould upon meats.* LORENZO FAGERSTEN.

Meat cured in the ordinary way is dipped in a hot solution of boracic acid, or its salts, and finally smoked.

221,580.—*Artificial leather.* CHARLES H. KNELLES.

Claim: A plastic compound for coating fabrics to imitate leather, consisting of glue mastic, dextrine, glycerine, chloride of iron, chrome-alum, and a suitable pigment.

221,630.—*Manufacture of artificial marble and stone.* JAMES H. THORP.

221,649.—*Treating furnace slag to convert the same into tiles, slabs and blocks.* JOSEPH WOODWARD.

The objects are removed from the moulds, while yet in a hot state, and annealed in a separate furnace.

November 18, 1879.

221,706.—*Carboys.* DANIEL E. SEYBEL.

Proposes to protect the neck of a carboy by a removable cap attached to the case.

221,753.—*Production of cold in ice machines.* CYPRIEN M. TESSIÉ DU MOTAY and LEONARD F. BECKWITH.

Proposes to use in ice machines a mixture of methyl chloride and anhydrous sulphurous acid, or similar gases, which are liquifiable at approximately the same temperature and pressure, and of which one is an inflammable, and the other a fire extinguishing gas.

221,836.—*Processes of making pigments of white lead.* GEORGE T. LEWIS and EAYRE O. BARTLETT.

The fumes arising from any metallurgical operation, in which lead or its ores are treated, are collected and "re-burned."

November 25, 1879.

221,923 and 221,924.—*Centrifugal apparatus for forcing volatile or corrosive liquids from sugar or other substances.* OTTO H. KRAUSE.

A description of this apparatus cannot be given without reference to drawings. The inventor proposes to treat substances which are impregnated with volatile or corrosive liquids, in a centrifugal machine, without loss of the liquids, or injury to the machine. He accomplishes this object by filling the magma into boxes of a peculiar construction, which are made of such material as will best resist the action of the various substances under operation. The mother liquor separated from the magma by centrifugal action, is retained in a separate compartment of the box, whence it can be removed, after stopping the machine, without again coming in contact with the dried substance.

222,100.—*Apparatus for making sulpho-cyanides.* JOSEPH TSCHERNIAC and HENRY GUENZBURG.

The process for which a German patent has been taken, is described in this JOURNAL, I, 118.

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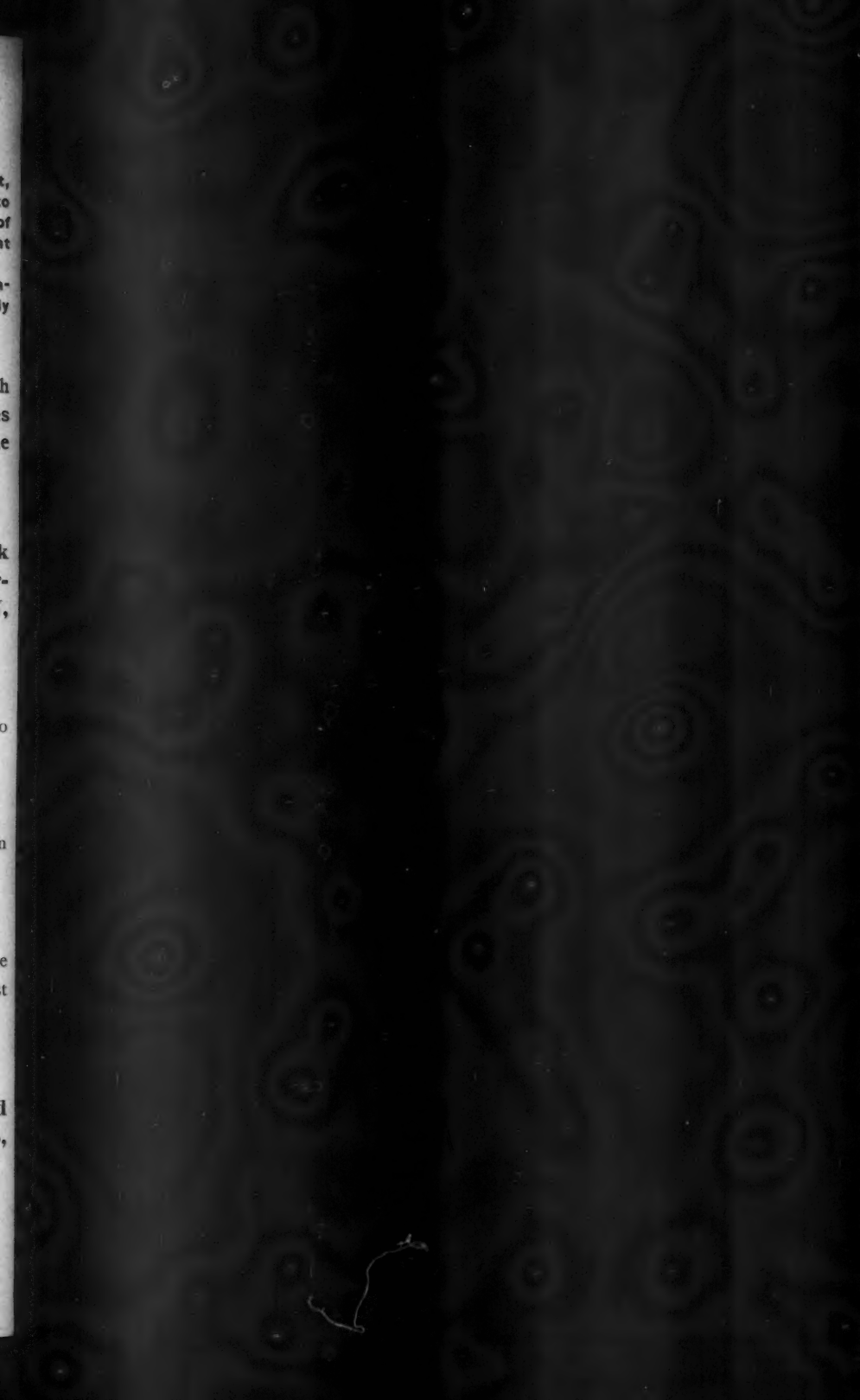
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